The American Statistician

A Publication of the American Statistical Association

APRIL 1955
Volume 9, No. 2

35 CENTS

CHAPTER PRESIDENTS AND SECRETARIES

ALBANY—**Abbott S. Weinstein,** *18-B Old Hickory Drive, Albany 4, New York;* **Robert E. Patton,** *17-A Old Hickory Drive, Albany 4, New York*

AUSTIN—**John H. Hargrove,** *2005 Raleigh, Austin, Texas;* **Stella Traweek,** *W.H. 221 University Station, Austin 12, Texas*

BOSTON—**Phillip J. Rulon,** *Harvard University, Peabody House, 13 Kirkland Street, Cambridge, Massachusetts;* **Dorothy Myers,** *222 Beacon Street, Boston 16, Massachusetts*

BUFFALO-NIAGARA—**Zenon Szatrowski,** *Univ. of Buffalo, Buffalo 14, N. Y.;* **Richard Schmidt,** *Univ. of Buffalo, Buffalo 14, N. Y.*

CENTRAL INDIANA—**Paul Irick,** *Route 8, Lafayette, Indiana;* **Donald L. Cheak,** *5432 East 19th Street, Indianapolis, Indiana*

CENTRAL NEW JERSEY—**John Q. Stewart,** *Princeton University Observatory, 14 Prospect Avenue, Princeton, New Jersey;* **William B. Schrader,** *Head of Dept. of Statistical Analysis, Educational Testing Service, Princeton, New Jersey*

CHICAGO—**John S. Coulson,** *Leo Burnett Company, Inc., 360 North Michigan Avenue, Chicago 1, Illinois;* **Lawrence Stickler,** *% R. R. Donnelley and Sons Company, 350 East Cermak Road, Chicago, Illinois*

CLEVELAND—**Clark E. Zimmerman,** *McCann-Erickson, Inc., 1300 National City Bank Bldg., Cleveland 14, Ohio;* **J. Cecil Rowe,** *Marketing Research Dept. No. 168, General Electric Co., Nela Park, Cleveland 12, Ohio*

COLUMBUS—**Campbell R. Graf, Jr.,** *2459 Dorset Road, Columbus 21, Ohio;* **Mikhail V. Condoide,** *188 West 10th Avenue, Columbus 1, Ohio*

CONNECTICUT—**C. H. W. Sedgewick,** *University of Connecticut, Storrs, Connecticut;* **Gordon M. Harrington,** *State Dept. of Education, 302 State Office Bldg., Hartford 15, Connecticut*

DAYTON—**Cyril G. Peckham,** *University of Dayton, Dayton 9, Ohio;* **Floyd Edward Smith,** *622 North Fountain Avenue, Springfield, Ohio*

DENVER—**Henry C. Mosher,** *Economic Statistician, The Mountain States Tel. & Tel. Co., P. O. Box 960, Room 1101, Denver 1, Colorado;* **Gene Ormand,** *Statistician, Blue Cross, 1653 Lawrence, Denver, Colorado*

DETROIT—**Stanley S. Roe,** *Automobile Manufacturers Assn., 320 New Center Bldg., Detroit 2, Michigan;* **James T. Oliver,** *Detroit Department of Health, 334 Bates Street, Detroit, Michigan*

HAWAII—**Albert L. Tester,** *Dept. of Zoology, Univ. of Hawaii, Honolulu 14, Hawaii;* **Charles F. Congdon,** *Asst. Prof., Univ. of Hawaii, Honolulu 14, Hawaii*

UNIV. OF ILLINOIS—**Francis G. Cornell,** *Bureau of Educational Res., University of Illinois, 1007½ South Wright Street, Champaign, Illinois;* **Charles F. Wrigley,** *Dept. of Psychology, University of Illinois, Champaign, Illinois*

ITHACA—**C. R. Henderson,** *Department of Husbandry, Cornell University, Ithaca, New York;* **Philip J. McCarthy,** *New York State School of Industrial & Labor Relations, Cornell Univ., Ithaca, N. Y.*

LOS ANGELES—**Hugh H. Brown,** *California Taxpayers Assn., 750 Pacific Electric Bldg., Los Angeles 14, Calif.;* **Charles R. Harbst,** *108 Via El Chico, Hollywood Riviera, Redondo Beach, California*

MILWAUKEE—**George W. Knick,** *College of Business Administration, Marquette University, Milwaukee 3, Wisconsin;* **William A. Golomski,** *Instructor of Mathematics, Marquette University, Milwaukee 3, Wisconsin*

NEW ORLEANS—**Opal S. Looby,** *234 East Livingston Place, New Orleans 20, Louisiana;* **Elsie M. Watters,** *School of Business Administration, Tulane University, New Orleans, Louisiana*

NEW YORK—**Meredith B. Givens,** *New York State Dept. of Labor, 1440 Broadway, New York 18, New York;* **Henry S. Miller,** *Queens College, Flushing 67, Long Island, New York*

NORTH CAROLINA—**R. C. Bose,** *Department of Statistics, University of North Carolina, Chapel Hill, North Carolina;* **Rashi Fein,** *Dept. of Economics, University of North Carolina, Raleigh, North Carolina*

OKLAHOMA CITY—**Mitchell Locks,** *University of Oklahoma, Norman, Oklahoma;* **R. W. Staples,** *Oklahoma Gas & Electric Company, 321 North Harvey, Oklahoma City 1, Oklahoma*

PHILADELPHIA—**Raymond T. Bowman,** *531 Derwyn Road, Drexel Hill, Pennsylvania;* **Ingrid Hahne,** *Economics Department, Temple University, Philadelphia, Pennsylvania*

PUERTO RICO—**Luz M. Torruellas,** *Puerto Rican Economic Association, P. O. Box 2003, University Station, Rio Piedras, Puerto Rico*

SACRAMENTO—**Norman Rudy,** *Sacramento State College, Sacramento; California;* **Wilbur L. Parker,** *360 Sandburg Drive, Sacramento 19, California*

SAN FRANCISCO—**William O. Jones,** *Food Research Institute, Stanford University, Stanford, California;* **Winton Pettibone,** *Economics Department, Standard Oil Co. of California, San Francisco 20, California*

ST. LOUIS—**Arthur C. Meyers, Jr.,** *3674 Lindell, St. Louis 8, Mo.,* **Richard E. Edgar,** *Social Planning Council, 505 North 7th, St. Louis, Missouri*

SEATTLE—**Grant I. Butterbaugh,** *6815 20th Avenue, N. E., Seattle 5, Washington;* **Clyde Courtnage,** *Accounting Dept., Frederick & Nelson, 5th at Pine, Seattle, Washington*

STATE COLLEGE, PA.—**Dr. Robert E. Clark,** *Pennsylvania State University, Sociology Dept., State College, Pennsylvania;* **Robert W. Kautz,** *School of Business, Pennsylvania State University, State College, Pennsylvania*

TULSA—**Milton F. Searl,** *Stanolind Oil and Gas Company, Tulsa, Oklahoma;* **William B. Rider,** *Stanolind Research Center, Box 591, Tulsa, Okla.*

VIRGINIA—**M. C. K. Tweedie,** *Virginia Polytechnic Institute, Blacksburg, Virginia;* **Clyde Y. Kramer,** *Department of Stat. and Stat. Lab., Virginia Polytechnic Institute, Blacksburg, Virginia*

WASHINGTON, D. C.—**Harry Alpert,** *National Science Foundation, Washington 25, D. C.;* **Margaret Martin,** *Office of Statistical Standards, Bureau of The Budget, Room 440, Washington 25, D. C.*

The American Statistician

APRIL 1955, VOL. IX, NO. 2

A publication of the
American Statistical Association

Founded 1839

The Editorial Committee welcomes the submission of manuscripts for possible publication. Two copies, double-spaced, should be sent to the Editor, Almarin Phillips, E-140 Dietrich Hall, University of Pennsylvania, Philadelphia 4.

News and notes should be sent to Dana Barbour, News Editor, American Statistical Association, 1108 16th Street, N.W., Washington 6, D. C.

Entered as second class matter March 11, 1938, at the post office at Washington, D. C., under act of March 3, 1897. *The American Statistician is published five times a year*—February, April, June, October and December—by the American Statistical Association, Editorial Office: 1108 16th Street, N.W., Washington 6, D. C. Subscription rate: one dollar and fifty cents a year or thirty-five cents per copy.

Anyone wishing to change his mailing address should allow eight weeks notice. A copy of the address taken from an issue of the periodical should accompany the change-of-address request.

NEWS

Bowman Heads Statistical Standards—Election of SPES Officers—Opinions on Standards—Meetings—Summer Sessions—New Publications

Raymond T. Bowman Appointed Head of Office of Statistical Standards

Raymond T. Bowman, Chairman of the Department of Economics at the University of Pennsylvania, has been named Assistant Director for Statistical Standards, Bureau of the Budget, by Rowland R. Hughes, Director of the Bureau. Dr. Bowman will succeed Stuart A. Rice, who was head of the Office of Statistical Standards from 1933 until his retirement from Government service last December 31st. In his new post Dr. Bowman will be responsible for coordination and improvement of Federal statistics, including the development of programs to collect data needed by the Government and the public, as well as elimination of unnecessary series.

Dr. Bowman has been on the economics faculty of the University of Pennsylvania since 1928. During this period he has accepted several temporary assignments with the Federal Government—with the War Production Board, 1942–44; as Director of Progress Reporting and Statistics with the Office of Contract Settlement, 1944–45; and as Assistant Administrator for Research with the Surplus Property Administration, 1945–46. He has been active in the American Statistical Association, being at present the president of the Philadelphia Chapter. He was Chairman of the Advisory Committee of the ASA on the Survey of the Statistical Operations of the Bureau of Mines, and has helped to arrange the annual conferences on business statistics sponsored by the ASA Business and Economics Section and the Wharton School of Finance and Commerce. He is also a member of the American Economic Association, the Econometric Society, and a director of American Academy of Political and Social Science.

Dr. Raymond T. Bowman

ASA Section on Physical and Engineering Sciences: New Officers and Meeting

The following have been elected as officers of the Association's new Section on Physical and Engineering Sciences (formerly the Committee on Statistics in the Physical Sciences), to which a charter was recently granted:

Chairman—Besse B. Day, Bureau of Ships, Navy Department

Secretary-Treasurer—Jack Moshman, Bell Telephone Laboratories

Executive Committee—Carl A. Bennett, General Electric Co.; Robert Bechhofer, Cornell University; Irving Burr, Purdue University; William R. Pabst, Bureau of Ordnance, Navy Department; and Harold F. Weaver, University of California.

The Section will hold a meeting in New York City on May 26 and 27, 1955, in conjunction with the Centennial of the College of Engineering of New York University. Abstracts of contributed papers to be presented at this meeting should be submitted by April 25th to Dr. J. S. Hunter, American Cyanamid Co., 30 Rockefeller Plaza, New York.

29th Session of ISI

The International Statistical Institute has announced that its 29th session will be held at Hotel Quitandinha, Petrópolis, Brazil, about 50 miles from Rio de Janeiro, from June 24 to July 2, 1955. Meetings have been scheduled on operations research, the position of statistics and statisticians in industry, the statistical basis of economic forecasting, the application of statistics in the physical sciences, recent developments in statistical decision theory, statistics in economically less advanced countries, statistics of regions within countries, and statistical education. There will also be sessions for country reports and contributed papers. Joint meetings will be held with the International Union for the Scientific Study of Population, the International Association for Research in Income and Wealth, and the Biometric Society.

Further Opinions on Standards for Statistics

Since the February issue of *The American Statistician* went to press several other chapters have taken polls of the views of their members on the establishment of statistical standards. In addition a number of ASA members have written to William W. K. Freeman, Chairman of the Ad Hoc Committee to Explore Opinion on Standards, to express their opinions on the subject.

The Austin, Texas Chapter tried to measure intensity of feeling as well as opinion among its members on the advisability of establishing statistical standards. The vote was as follows:

Favoring strongly	14
Favoring mildly	12
Uncertain	4
Opposing mildly	0
Opposing strongly	1

Seven of those voting said they knew of cases illustrating the need for standards, and five expressed a willingness to submit a description of such cases.

The Central Indiana Chapter presented its members with four choices, canvassing members not attending the January meeting as well as those attending. The results were as follows:

Statement	Agree	Disagree	Blank
1. It would be just as well to do nothing about the establishing of statistical standards	4	11	3
2. Something very general, such as a "Ten Commandments for Statisticians" should be developed to cover the field of statistical activity	13	2	3
3. Separate sets of standards should be evolved for particular types and stages of statistical activity	10	4	4
4. Any formulation of standards should be accompanied by concrete illustrations of practices which do and practices which do not conform with standards	11	3	4
Replied		18	36%
No Reply		32	64
		50	100%

The Chicago Chapter gave to its members attending the January dinner meeting a questionnaire which dealt particularly with standards for publication of statistics. The Detroit Chapter mailed to its members a questionnaire with the same options as the Chicago Chapter. The result of the voting is as follows:

	Chicago	Detroit
1. This is a great forward step in the statistical world, and the Association should, by all means, develop standards for statistical practice	14	5
2. There is some merit to this plan and the Association should certainly give it further consideration	16	6
3. I don't think the Association should involve itself in such matters	3	1
4. I think the whole idea of statistical standards is unrealistic and the Association should not have anything to do with it	2	3
5. I don't know enough about this problem to make an intelligent statement, but I would like to learn more about it	9	1
6. I don't care	0	0
Total	44	16

It should be noted that the response rate to the mail survey of the Detroit Chapter was low, 72% of those canvassed having failed to reply.

The Tulsa Chapter held informal discussions with eight of its members who expressed an interest in the question of establishing statistical standards. Four of these members were definitely in favor of the establishment of such standards, three were generally favorable, and one expressed himself as being "not eager."

The Los Angeles Chapter did not poll its members on the desirability of establishing standards, but reports that after discussion at a meeting the concensus was that the problem breaks down into three sub-divisions: (1) Technical standards for statistical products, (2) Code of ethics for statisticians, (3) Certification of statisticians. The view was expressed that technical standards are practical and desirable, but not easy to do. A code of ethics might be regarded as a conversion of item (1), because if statisticians do the right things their product will have the correct character. Certification of statisticians was regarded as a long way off. It was pointed out that statisticians are all things to all organizations. It was also suggested that scholastic degrees serve the purpose of showing a prospective buyer the extent of preparation a statistician offers, even if only in a very general way.

Two past presidents of the Association were among those who have written to express their views. One comments as follows:

"I think it would be useful for the thinking of all of us if your Committee could examine codes of ethics which have been developed by such groups as engineering societies, lawyers, physicians, psychologists, etc. I imagine the problems of developing standards of conduct for practicing statisticians is not too different from those which have been faced by these groups for years. The problem comes up, as I see it, mainly in connection with the practicing or consulting statistician, who earns his living by doing applied statistical work in the various fields in which statistical methods are useful. There needs to be some code of ethics or procedures by which the profession and public are both protected from what we might call quackery. The psychologists have recently spent a good deal of time on this problem, I believe.

I am suggesting that the Committee take a look at what other groups have done because I believe a good many blind alleys can be avoided by doing so. There is much similarity of problems of conduct and ethics from one group to another and we may as well capitalize on their experience."

Another writes that he is out of touch with Association affairs and indifferent to the matter in hand. However, he does express concern with *professional* standards as distinguished from *statements* of procedure and ethics.

Dr. W. E. Deming writes in part as follows:

"One thing that statisticians have learned in taking a survey is that the questions have no meaning except with reference to the respondent's experience and knowledge of the subject. I wonder seriously whether most statisticians have had experience in which the need for standards, and, indeed, the meaning of the word standard, have come forcibly into their experiences.

There is only a small amount of literature on the subject, but there is a beginning. You probably have a number of references but may I call your attention to a paper on the subject in the last issue (December) of the J.A.S.A., and also a series of papers in the journal *Current Business Studies*, October, 1954, published by the Society

of Business Advisory Professions at New York University, New York 3.

The content and breadth of standards of the statistician's performance have changed very greatly during the past few years and I dare say that only a small minority has had occasion to rub up against this hard fact."

Dr. M. C. K. Tweedie, President of the Virginia Academy of Science Chapter, after discussion with his colleagues at Virginia Polytechnic Institute, writes as follows:

"... My ideas on the question of standards are still somewhat amorphous. The problem seems too nebulous to be discussed readily in the absence of clearly formulated objectives and proposals.

There seem to be three main fields of statistical activities in which standards might be set up:

(a) Ethics of professional relations,
(b) Rules of procedure as regards the collection of, and reporting on, statistical information
(c) Terminology and notation.

In each case the standards would probably most often be used defensively, especially as it has been agreed that they should codify existing unformulated but widely used standards.

Under (a) would be included such things as preservation of confidences, honesty of opinions, conscientious work, avoidance of unwarranted delays, minimal advertising. No doubt a code for these would occasionally be worth having, either to support resistance to an unethical proposal or to attack unethical behaviour.

It would be simpler to exclude from a code for (a) any aspects of (b), and to regard the ethical questions which arise in (b) as a subheading of (b). Statistical operations are very largely a matter of selection and in their professional aspects are to a significant extent an art (in co-ordinating statistical recommendations and actions with technical considerations in the field to which they apply), just as in the application of any science, and are to that extent subjective and difficult to codify. Any attempt to codify (b) will tend to be a rudimentary encyclopedia of statistical procedures. So far as (b) is concerned, two lines of attack seem open: (i) to issue professional certificates to adequately qualified persons, so that anyone engaging their services, or following or publishing their opinions, will have some degree of assurance of the quality of their work; and (ii) to try to persuade editors of all types of publications, though of course especially technical ones, to see that any report using statistical material is checked by an adequately qualified person (or persons) if the author himself is not one. However, on this last point, statistics is so all pervasive a subject that editors will inevitably need to be free to use their judgment on each case. A great deal of technical work is tolerably satisfactory for its primary purpose in spite of bad statistical procedures, and to insist on a formal statistical practice would result in much unjustified frustration although it would prevent some worthless material from being published. So far as technical publications are concerned it is up to the editor and his referees (and editorial committee) to see that an appropriate standard is achieved. Possibly a formal code for their guidance would be worth developing, to be consulted when the services of a qualified statistician are not obtained."

Conference on Business Statistics

The Wharton School of Finance and Commerce, University of Pennsylvania, and the Business and Economics Statistics Section of the American Statistical Association will hold their 1955 Conference on Business Statistics at the Wharton School on June 9 and 10. This is the third conference held under this joint sponsorship. The purpose of the conference is to provide opportunities for persons working in industry in areas which require the use of statistics and statistical methods to hear of recent developments in selected fields from both business and academic practitioners. The panel arrangement provides an opportunity for conferees to discuss their mutual problems and the methods they are using to solve them.

The conference will consist of morning and afternoon panel sessions on Thursday, June 9, and morning panel sessions on Friday, June 10. The topics to be discussed and the panel chairmen are:

1. Statistical Methods for Forecasting Sales
   Chairman, Wroe Alderson, Alderson and Sessions
2. Statistical Methods for Inventory Control
   Chairman, T. M. Whitin, Massachusetts Institute of Technology
3. A Survey of the Uses of Linear Programming in American Business
   Chairman, Merrill M. Flood, Columbia University
4. Statistical Methods for Measuring Business Expectations
   Chairman, Irwin Friend, University of Pennsylvania

John W. Tukey, of Princeton University and the Bell Telephone Laboratories, will speak on "Experimental Design in American Industry" at a luncheon meeting for the combined participants on Thursday. There will be a cocktail hour and dinner meeting following the afternoon sessions. George W. Taylor, University of Pennsylvania will speak on "Labor Relations—1955."

After the Friday morning panels, Ralph J. Walkins, President of the American Statistical Association and Director of Research, Dun and Bradstreet, Inc., will speak at the final luncheon meeting.

Programs and registration blanks will be mailed early in May to members of the Business and Economics Statistics Section who live in Northeastern United States.

Third Inter-American Statistical Conference

The Council of the Organization of American States has convoked the Third Inter-American Statistical Conference to be held in Quitandinha, Petrópolis, Brazil, from June 9 to 22, 1955. The purpose of the Conference is to develop inter-American cooperation in the technical field of statistics and to deal with statistical matters of common interest to the American States. Within that general objective, the primary object of the Third IASC is to assay the current status of statistical development in the American nations and to reassess their statistical needs in order to make decisions and establish priorities considered desirable in the following years for the orientation of statistical progress in the Western Hemisphere. The program consists of a series of specific topics in the fields of economic and financial statistics, social statistics, statistical organization and administration, statistical education and science, and demographic and health statistics.

Delegations of the 22 American governments, representatives of international organizations and of national non-governmental institutions with statistical interests, and invited statistical specialists will participate in the Conference.

Concurrently with the Third Inter-American Statistical Conference, the Third General Assembly of Members of the Inter-American Statistical Institute (IASI), the first session of its Committee on Statistical Education (CSE), and the third session of its Committee on Improvement of National Statistics (COINS) will also be held in Quitandinha, the latter two commencing June 3, 1955. The dates of the Conference have also been arranged to coordinate with those of the 29th session of the International Statistical Institute in order to facilitate the attendance of all American participants at both meetings.

U. N. Statistical Yearbook

The 1954 issue of the "Statistical Yearbook", prepared by the Statistical Office of the United Nations with the cooperation of the national statistical authorities of over 140 countries and territories and with the assistance of U.N. specialized agencies and other intergovernmental bodies, was published in February. This is the sixth issue of this publication, and is similar in content and arrangement to previous volumes. A table on the number of television sets licensed or in use has been added, and the table on life expectancy re-introduced in this issue. Other tables have had their subject scope extended, or have been re-drafted to present the data in a more useful manner. An appendix on the principal statistics published by international organizations has been re-introduced. With appendices the volume contains 594 pages, with 179 tables.

The Yearbook may be purchased at $6.00, paper-bound, or $7.50 cloth-bound, from the International Documents Service, Columbia University Press, 2960 Broadway, New York 27.

Summer Offerings in Statistics at Iowa State College

The Department of Statistics at Iowa State College will offer a course in decision theory at the advanced graduate level during the first half of the 1955 summer quarter. The course will be taught by Dr. S. L. Isaacson. Members of the graduate faculty in statistics will be available during most of the summer for consultation on graduate research (Stat. 699) and for special problems courses (Stat. 599).

Other offerings for the two six-week sessions (June 13–July 20 and July 20–August 26) of the summer quarter are designed mainly for the graduate minor in statistics and for the beginning graduate major in statistics who wishes to satisfy prerequisite requirements for more advanced courses. These additional offerings include Stat. 401 and 402, "Statistical Methods for Research Workers," offered in sequence; the sequence, Stat. 447 and 448, "Statistical Theory for Research Workers;" Stat. 411, "Experimental Designs for Research Workers;" and Stat. 421, "Survey Designs for Research Workers." Students may register for one or both summer sessions. For additional information, write to: T. A. Bancroft, Director, The Statistical Laboratory, Iowa State College, Ames, Iowa.

Summer Sessions at Berkeley, California

This year's program at the Statistical Laboratory of the University of California, Berkeley, California, consists of two sessions: June 20–July 30 and August 1–September 10, 1955. The faculty of the summer sessions will include Professor G. E. Bates of Mt. Holyoke College, South Hadley, Massachusetts; Professor J. Neyman, Professor Charles H. Kraft and Mr. Howard G. Tucker of the Statistical Laboratory, University of California.

The program includes undergraduate courses primarily meant for students transferring from other centers who would like to embark on advanced studies in Berkeley during the regular academic year. Professor Neyman will be available for consultations on work leading to higher degrees. There will be no graduate course program. However, graduate students may be interested in a series of lectures and seminars to be given through July and August in connection with the second part of the Third Berkeley Symposium on Mathematical Statistics and Probability. The scholars who promised to participate in this event are: T. W. Anderson, Columbia University; M. S. Bartlett, University of Manchester; J. Berkson, Mayo Clinic; David Blackwell, Howard University and University of California; A. J. L. Blanc-Lapierre, Université d'Alger; J. Doob, University of Illinois; W. Feller, Princeton University; R. Fortét, Institut Henri Poincaré; A. Girshick, Stanford University; J. M. Hammersley, Oxford University; J. L. Hodges, Jr., University of California; W. Hoeffding, University of North Carolina; Lucien LeCam, University of California; Erich L. Lehmann, University of California; P. Lévy, l'École Polytechnique; H. Robbins, Columbia University; Herman Rubin, Stanford University; and C. M. Stein, Stanford University.

Further information may be obtained from Professor J. Neyman, Director of the Statistical Laboratory, University of California, Berkeley 4, California.

Eighth International Conference of Labor Statisticians

The Eighth International Conference of Labor Statisticians was convened by the International Labour Organization in Geneva, Switzerland, on November 23 and ended on December 3, 1954. The Conference was attended by 70 delegates and advisers representing 30 countries, and by 11 delegates from 7 international agencies. The United States delegation consisted of Ewan Clague, Special Assistant to the Secretary of Labor, and A. Ross Eckler, Deputy Director of the Bureau of the Census.

The subjects of the agenda for the Conference were: (1) Employment and unemployment statistics; (2) International classification of occupations; (3) International comparisons of real wages; (4) Statistics of occupational diseases; and (5) Report of recent statistical progress in a number of fields, including productivity and wage statistics. A number of other subjects were also considered by the Conference, including resolutions concerning the development of international standards for social security statistics and the compilation of current international standards in labor statistics.

In the field of labor force, employment and unemployment statistics a resolution (I) was adopted which covers general objectives, definitions, classifications, scope and nature of statistics, and publication. As a means of im-

plementing the objectives described in this resolution the International Labour Office was requested to prepare one or more technical manuals on methods, and to conduct intensive on-the-spot surveys of actual statistical operations in various countries. A resolution (VI) concerning underemployment was also adopted, which requested the ILO to study problems of measurement of underemployment and of irregular employment with a view to presenting proposals to the Ninth International Conference of Labor Statisticians, and meanwhile to include tentative findings in a manual.

A classification of occupations, including a simple list of the major occupational groups of the civilian labor force, was adopted in 1949 by the Seventh International Conference of Labor Statisticians. The proposal before the Eighth Conference was the further development of this occupational classification to include a list of minor groups. The major problems faced by the Committee on Occupational Classification were the level of skill and training, the treatment of working proprietors or owners, the treatment of unpaid family workers, and finally, the difficulty of translating occupational terms from one language to another. The issue of how to handle the classification of occupations which were closely related but which had marked differences in the level of skill and training required was not finally resolved. The decision as to whether to classify retail proprietors as managers or sales workers was left to each country to be determined on the basis of the facts of the situation. With respect to unpaid family workers it was finally decided that this group connotes a status, like employer or employee, and not an occupational group. At the conclusion of its work the committee presented to the conference a provisional classification of occupations, which was adopted by the Conference as Resolution II. Another resolution (IX) was adopted requesting the Governing Body of the ILO to circulate this provisional classification to member governments for their comments, and to place the same subject on the agenda of the Ninth Conference.

The chief conclusions of the Conference with respect to international wage comparisons were embodied in Resolution V. Apart from certain definitions and methods set forth in the resolution, the most significant features are recommendations for (1) further study on the payments for various services, whether by workers from earnings or by employers and/or public agencies; and (2) the regular publication by various countries of statistics on wages, hours of work, prices, and consumption essential to international comparisons of real wages. The Conference also considered the comparison of real wages in agriculture, and in Resolution VII requested the Governing Body of the International Labour Office to instruct the Office to prepare a report on methods of comparison of real wages in agriculture and between agriculture and industry, for presentation to a subsequent International Conference of Labour Statisticians, and also requested that research on the comparison of real wages in agriculture be coordinated with research on family living in less well developed areas.

A resolution (IV) concerning statistics of occupational diseases was adopted by the Conference, and in addition a resolution (III) was adopted which requested the International Labour Office, in cooperation with the World Health Organization, to study such data as may be available on occupational mortality and morbidity in general with a view to their publication.

Other resolutions included one on the development of international standards in social security statistics (XI), which called for creation by the ILO of a working group of experts to assist it, and one (VIII) which requested the ILO to prepare a compilation of existing international standards in the field of labor statistics.

Linear Programming Symposium

A symposium on linear programming, sponsored by the Office of Scientific Research of the Air Research and Development Command, and conducted by the National Bureau of Standards and the Directorate of Management Analysis, DCS/Comptroller, USAF, was held in Washington on January 27, 28 and 29. 364 persons registered for the conference. There were sessions on practical applications, economic theory, computation procedures and the theory of linear inequalities, at which the following addresses were presented:

Military Applications of Linear Programming—Walter Jacobs, Headquarters, USAF

How to Solve a Linear Programming Problem—Alan J. Hoffman, National Bureau of Standards

Linear Programming and Economic Theory—Paul Samuelson, Massachusetts Institute of Technology

Linear Inequalities and Convex Polyhedral Sets—Albert W. Tucker, Princeton University

Linear Programming's Future—George B. Dantzig, RAND Corporation

In addition there were 27 short papers. The proceedings of the Symposium will be published and made available for sale. Persons interested should write to Alan J. Hoffman, Applied Mathematics Division, National Bureau of Standards, Washington 25, D. C., from whom copies of the complete program may also be obtained.

Quality Control Clinic Held at Rochester

The newly-formed Section on Statistics in the Physical and Engineering Sciences held its first active session on February 15, 1955 in conjunction with the 11th Annual Clinic of the Rochester Society for Quality Control. The program of the Clinic was divided into seven series of sessions, three of which were co-sponsored by panels of the S.P.E.S. These sessions and the speakers were as follows:

Series I—Research and Statistics (co-sponsored by the Chemistry, Engineering, and Physics Panels)

"Rejection of Outlying Observations"—Frank Proschan, Missile Systems Laboratory, Sylvania Electric Products, Inc.

"Planning and Analyzing the Experiment"—Milton E. Terry, Bell Telephone Laboratories

Series IV—Chemical Applications (co-sponsored by the Chemistry Panel)

"Some Concepts in Experimentation"—William J. Youden, National Bureau of Standards

"The Determination of Product Variability"—Carl A. Bennett, Hanford Atomic Products Operation, General Electric Co.

Series VII—Advanced Techniques (co-sponsored by the Engineering and the Physics Panels)

"Elements of Experimentation"—Daniel B. DeLury, Ontario Research Foundation

"Multiple Comparisons"—Charles W. Dunnett, Lederle Laboratories Division, American Cyanamid Co.

FEDERAL STATISTICAL ACTIVITIES

1956 Budget Recommendations for Major Statistical Programs

Increases for a number of current statistical programs are included in the budget for the fiscal year 1956 which was presented to the Congress by the President on January 17. In his Budget Message the President stated: "We do not have all the statistical information required in our dynamic economy. I am therefore recommending a governmentwide effort to improve statistics in those areas where our work has been most handicapped by incomplete information."

The present effort to impove economic statistics includes major increases for statistics on employment and unemployment (Bureau of Labor Statistics, Bureau of the Census) and on construction and housing (Business and Defense Services Administration, Bureau of Labor Statistics, Bureau of the Census). Provision is also made for a survey of farmers' expenditures for farm production and for family living (Agricultural Marketing Service). Other statistical programs of general interest for which increases are recommended include the joint financial reports program of the Federal Trade Commission and the Securities and Exchange Commission; analysis of national economic trends (Office of Business Economics); statistics on wages and industrial injuries (Bureau of Labor Statistics); research in crop and livestock estimates (Agricultural Marketing Service); vital statistics (National Office of Vital Statistics); annual sample surveys of retail trade and manufacturing activity (Bureau of the Census); and State and local government finances (Bureau of the Census).

For the first time, the budget document this year contains a separate Special Analysis in which budget recommendations for major statistical programs are summarized on a subject-matter basis. Inclusion of this analysis is in accord with the recommendation made last summer by the Subcommittee on Economic Statistics of the Joint Committee on the Economic Report that a section on economic statistics be included in the President's annual budget. Presentation of the analysis, with its consolidated statement of expenditures for major statistical programs, is also in line with the recommendations made by Frederick C. Mills and Clarence D. Long in their study of Federal statistical agencies for the first Hoover Commission.

DONALD C. RILEY,
Office of Statistical Standards,
Bureau of the Budget

Joint Economic Committee Hearings on Economic Statistics

Hearings on "Economic Statistics" were held February 9 by the Joint Committee on the Economic Report, as part of its series of hearings on the 1955 Economic Report of the President. Representatives of business, labor and research organizations participated in the session on economic statistics, discussing areas in which they see need for further improvements as well as the increases requested in the 1956 Budget for current statistical programs.

Preceding the panel discussion, the increases requested for current statistical programs in the Budget for fiscal year 1956 were described by Donald R. Belcher, Assistant Director, Bureau of the Budget. After commenting on the content and purpose of each of these increases, Mr. Belcher concluded: "For fiscal 1956, the President has recommended appropriations which . . . will provide for expansion of $4.8 million, or about one-sixth, in present levels for the current statistical programs. . . . The increases are all directed at known weaknesses or gaps in existing statistics and will measurably improve our economic intelligence. In the two fields of major increases [manpower and construction], I am convinced that the expanded programs will raise the entire level of accuracy and detail, and correct major deficiencies disclosed during the postwar period."

Members of the panel who testified were: Robert J. Eggert, Marketing Research Manager, Ford Division, Ford Motor Company; Walter E. Hoadley, Jr., Treasurer, Armstrong Cork Company; Lowell Reed, President, Johns Hopkins University; Beardsley Ruml, Chairman of the Business Committee of the National Planning Association and member of the Research and Policy Committee of the Committee for Economic Development; Lazare Teper, Director of Research, International Ladies' Garment Workers' Union; T. E. Veltfort, Manager, Copper and Brass Research Association; and Ralph J. Watkins, Director of Research, Dun & Bradstreet, and President of the American Statistical Association.

In response to a poll of the panel by Congressman Bolling, who presided at the session, all members endorsed the increases recommended for 1956. In addition, in their prepared statements, panel members called attention to further areas where they believe strengthening or improvements are needed. Each of the statements stressed the importance to all groups of accurate and prompt statistical data on the functioning of the economy.

Mr. Eggert, who represented the Chamber of Commerce of the United States, referred to the Chamber's position that all government activities not strictly essential be "treated as luxuries and reduced accordingly," and stated that nevertheless the Chamber endorses the government-wide effort to improve statistics because of "the vital importance to our whole national economy of accurate, prompt and usable statistics." For the increases recommended for 1956, he referred particularly to those to be used for unemployment and employment data, construction statistics, financial statistics of State and local governments, and electronic equipment. In addition he stated that the lack of information on the value added by wholesale and retail trade and other aspects of distribution constitutes a notable gap in the statistical program, and urged that the concepts and techniques necessary for computing such series be developed now.

The importance of the Federal Government's current and proposed economic statistics program for both public and private policy-making purposes was stressed by Mr. Hoadley, who called the growing use of economic statistics "one of the most significant developments affecting both private and public decision-making in recent years." He cited construction statistics (particularly those dealing with home-building or alteration) and industrial classification (particularly "inexact or incomplete definitions of industries" used in the Census of Manufactures) as illustrations of areas "requiring prompt statistical improvement in the public interest."

Two needs in the area of population and vital statistics were pointed out by Dr. Reed. First, in the field of manpower statistics, he suggested the need for more and better data not only on employment and occupations but on people and their

capacities—skills now held and skills needed. He stated that we are not in a position to collect such statistics at the present time, but recommended that the Office of Statistical Standards in the Budget Bureau undertake a study of manpower statistics in this broader sense with a view to providing this kind of information in the future. Second, in the field of morbidity statistics, Dr. Reed stressed the need for data on illness and disability within the population. He called attention to proposals for the collection of health statistics made a year ago by the National Committee on Vital and Health Statistics, and urged that prompt consideration be given to these proposals.

Mr. Ruml called attention to the necessity of objective statistical reporting as a basis for discoveries in economics and finance and the determination of policy, and mentioned two examples of statistical inadequacy at crucial points: (1) inadequate knowledge of the increase in productivity per man hour from year to year, and (2) the need for improved statistical reporting in the field of savings—not only the figures on savings banks, but information on current withdrawals from consumption and their distribution by classification. On productivity he stated that "the choice of 2% or 3% in productivity increase per man hour per year means the choice of 20% or 30% in the increase of gross national productivity ten years from now, a difference of some 35 billion dollars. Clearly our statistics on productivity must be as accurate and as meaningful as it is humanly possible to make them." On savings, after analyzing the present lack of relation between consumer income, consumption and spending, he concluded that "we need as never before comprehensive, accurate, meaningful and prompt statistics on the savings and spending behaviour of American citizens. Without such knowledge the making . . . and implementation of policy can be based only on an experience which is largely personal, imperfect and obsolete."

Mr. Teper spoke particularly of the need for fuller statistics on employment and unemployment, the labor force, labor conditions, and levels of living. He endorsed the increases proposed for 1956, and called attention to other areas where improvements are needed, such as farm employment statistics, additional detail in current information on unemployment insurance beneficiaries, studies of the nature and extent of the different fringe benefits, a new survey of consumer expenditures for the urban population, and information on the extent to which new construction meets the economic needs of American families. He also criticized the 1955 Economic Report for failure to publish detailed statistical data which led to certain conclusions in the report.

Speaking on the basis of his experience as a member of a number of advisory committees on various aspects of economic statistics, Mr. Veltfort stated that "there is little doubt that our Federal statistical programs must steadily grow with the increase in the extent and complexity of our economy," and that "provision must be made for the constant improvement in these statistical measures which will permit better informed administrative policies." He emphasized the importance of censuses at regular intervals, with adequate provision for improvement in content and comprehensive analysis, and of intercensal surveys in such areas as employment and housing; and he urged expanded use of advisory groups representing those who supply as well as those who use the statistical information. In addition to new series for which provision is already made or requested, he proposed further exploration of the effects of the growth in pensions and fringe benefits, study of the units of capital required for the increase in output per man hour and of the contribution of management to higher productivity, more information on the interrelationship of various segments of the economy, and more detailed information on the final impact of taxes.

Mr. Watkins stressed the dependence throughout our society—in private business management as well as in government administration—on good statistical records and analysis for sound management of the economy. At the same time he called attention to the necessity of recognizing that these measures cannot represent certainty but only reasonable approximations under the given circumstances, and that they must be revised from time to time in the light of better information and on the basis of improved analysis. His statement dealt particularly with the location and role of the statistical coordinating agency. After reviewing the establishment of the office in the mid-30's as an independent agency, its subsequent transfer to the Bureau of the Budget, and the study of Federal statistical organization and services made in 1948 by the Hoover Commission Task Force on Statistical Agencies, he expressed the view that the coordination and leadership function for Federal statistical programs "has been neglected and starved and permitted to decline very seriously in content and prestige." This deterioration, he stated, has come about despite the efforts of the very able and conscientious men who have labored to make a success of the statistical coordinating function. He expressed the opinion that, in view of the differences in functions, the location of the Office of Statistical Standards within the Bureau of the Budget should be reexamined.

The full text of the session on economic statistics is included with those for other sessions in 1267-page printed Hearings on the "January 1955 Economic Report of the President." Other sessions in the hearings dealt with the economic philosophy underlying the Economic Report, problems of regional and industrial unemployment, fiscal policies, monetary policies, monopoly and anti-trust policies, agricultural policies, public works policies, foreign economic policies, and views of economic interest and research groups. The Hearings are available as a sales document, and copies may be purchased, at $3.50 each, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

JOHN LEHMAN, *Clerk,*
Joint Committee on the Economic Report, U. S. Congress

and

VIRGINIA T. VENNEMAN,
Office of Statistical Standards, Bureau of the Budget

Report on Pilot Survey of Commodity Movements by Truck

The Transportation Division of the Bureau of the Census has issued a report on its "Pilot Survey of Commodity Movements by Truck, March–May 1953." This survey was made primarily to develop and test a method for collecting statistics on the volume of goods hauled in private and "exempt" for-hire trucks (i.e., in property-carrying motor vehicles that are not subject to economic regulation by the Interstate Commerce Commission, or owned by Federal, State or local governments). The initial survey was limited to hauls for distances of 25 miles or more, largely to simplify reporting problems and avoid other complications that would have arisen from an intermingling of all classes of truck hauls. However, experience gained from this survey indicates that an expansion to all lengths of hauls would be feasible and desirable.

As described in the report, the method is based on probability sampling techniques to establish a revolving panel of truck owners to report during each of the 13 weeks covered by the statistical tabulations. Some 8,000 truck owners were in the basic sample, of whom about 2,500 were found to be within the scope of this survey and were requested to submit detailed reports of commodities hauled on their trucks. The cooperation of truck owners was excellent—97 percent of the total requested to keep the "log" actually submitted the information at the end of the period.

The report presents 18 tables showing such data as tons, ton-miles and average length of haul by class of commodity, type of service, kind of business, size of motor vehicle, and mileage block. The report also contains tables showing approximate sampling errors for the major items tabulated in the survey.

Copies of the report are available, at a cost of 50 cents per copy, from the Transportation Division, Bureau of the Census, Washington 25, D. C.

DONALD E. CHURCH, *Chief,*
Transportation Division,
Bureau of the Census,
Department of Commerce

Surveys of Expenditures for Alterations and Repairs

As part of a broad program of the Department of Commerce to improve the statistical series in the field of construction, the Bureau of the Census is cooperating with the Business and Defense Services Administration in developing techniques and procedures for the collection of data on alterations and repairs for both residential and nonresidential property. The procedure being developed involves collecting data directly from the owner or tenant rather than from related government records or other secondary sources.

The first survey in this field was made by the Bureau of the Census last June on a national sample of owner-occupied residential properties. The final report for that survey has been released and is available from the Bureau of the Census. The report contains estimates of the amount of money spent on contract work as well as on materials and equipment which the home owner purchased during the first five months of 1954 in connection with repairs, replacements, alterations, improvements, and additions.

According to the results of the survey, about $3 billion were spent during the five-month period. About one-half the money was spent for materials purchased directly by the home owners; the other half was paid to someone else for contract work. Most of the materials were put in place by the households themselves in "do-it-yourself" home-improvement projects. No data were obtained on the amount spent by renters.

Following the survey of expenditures on residential properties, the Census Bureau is doing some preliminary work in preparing for a similar survey on commercial properties. An initial exploration is being made by the Census staff on the problems involved in making a survey of retail business properties. Tentative plans are being made to conduct a national survey of business properties later this year.

CARL A. S. COAN, *Chief,*
Inventory Statistics Section,
Population and Housing Division,
Bureau of the Census,
Department of Commerce

"Techniques of Preparing Major BLS Statistical Series"

The Bureau of Labor Statistics has issued, as Bulletin 1168, a new edition of "Techniques of Preparing Major BLS Statistical Series." The volume supersedes the bulletin published under the same title in 1950, and is designed to meet the need for an up-to-date comprehensive description of the methods and techniques used in the preparation of BLS series.

In separate chapters devoted to particular series, the bulletin describes the scope of the series, the concepts and definitions used, the sources of the data, the methodology employed, the sampling and estimating techniques, the limitations of the series, and the uses of the data. A selected bibliography is also provided at the end of each chapter. In addition to the chapters dealing with specific series, the bulletin contains an introductory chapter which describes similarities and differences in methodology used in the preparation of BLS series.

The series included in the bulletin are indicated by the following chapter headings:

Construction—
- National Housing Volume
- Expenditures for New Construction
- Labor Required for New Construction

Industrial Hazards—
- Work-injury and Accident-cause Statistics

Manpower and Employment Statistics—
- Measurement of Industrial Employment
- Hours and Earnings in Nonagricultural Industries
- Measurement of Labor Turnover

Prices and Cost of Living—
- The Consumer Price Index
- Wholesale Price Indexes

Wages and Industrial Relations—
- Occupational Wages and Supplementary Benefits
- Work Stoppage Statistics
- Collective Bargaining Agreements

Productivity and Technological Development—
- Trends in Output per Man-hour

Copies of "Techniques of Preparing Major BLS Statistical Series" (Bulletin 1168) may be purchased at 65 cents each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

W. DUANE EVANS,
Chief Statistician,
Bureau of Labor Statistics,
Department of Labor

THE FINANCIAL AND MEMBERSHIP STATUS OF THE AMERICAN STATISTICAL ASSOCIATION

SAMUEL WEISS

Executive Director,
American Statistical Association

ABE ROTHMAN

Assistant Chief,
Office of Statistical Standards,
Bureau of Labor Statistics

At the end of 1954, the American Statistical Association had a membership of approximately 5,150 and an accumulated financial surplus of $30,900—both the largest in the history of the Association. The members represented every State in the United States, four U. S. possessions, and 52 foreign countries. They held an average of 1.6 memberships per member in the ASA's five sections, and an average of 1.9 memberships in other professional societies.

These are the highlights of the data on the present status of the American Statistical Association. Since the preparation of the 1954 Membership Directory has resulted in the availability of current information on ASA members, this appears to be an appropriate time to take stock of the Association. This report will discuss, first, the general financial and membership status of the ASA and, second, various characteristics of ASA members—their geographical distribution, sectional interests, and affiliation with other societies.[1]

[1] The data on total membership, geographical distribution, and financial status are from final 1954 estimates. The data on sectional membership and membership in other professional societies are based on responses from 4,674 members (a response of approximately 90 percent) to the 1954 Membership Directory questionnaire sent out in the spring of 1954. This questionnaire was less detailed than some previous ones; for instance, it did not request information on employment and education, which had been included in earlier questionnaires.

For earlier analyses of the composition of the ASA membership, see the following: Willford I. King, "Classification of Members of American Statistical Association on Basis of Duties and Interests," *Journal of the American Statistical Association*, Vol. 22, June 1927, pp. 224–226. Stuart A. Rice and Morris Green, "Interlocking Memberships of Social Science Societies," *Journal of the American Statistical Association*, Vol. 24, September 1929, pp. 303–306. Stuart A. Rice and Morris Green, "Composition of the American Statistical Association," *Journal of the American Statistical Association*, Vol. 25, June 1930, pp. 198–202. Richard L. Funkhouser, "Membership of the American Statistical Association on Its Hundredth Anniversary," *Journal of the American Statistical Association*, Vol. 36, September 1941, pp. 329–342. Abner Hurwitz and Floyd C. Mann, "The Membership of the American Statistical Association—An Analysis," *Journal of the American Statistical Association*, Vol. 41, June 1946, pp. 155–170. Dickson H. Leavens, "Overlapping Membership of Societies," *The American Statistician*, Vol. 3, June–July 1949, pp. 4–5.

General Status of the ASA

The present position of the ASA may be described as one of financial and organizational strength following a five-year period of growth. As shown in Figures 1 and 2 and in Table 1, membership has increased approximately 23 percent over the total for 1950, and financial surpluses have accumulated each year since 1949.

The present financial goal is to have an accumulated surplus equivalent to approximately one year's budget. This goal was set in 1949 by the Board of Directors and has been reaffirmed each year since then. The Board feels that a surplus of this size will give the

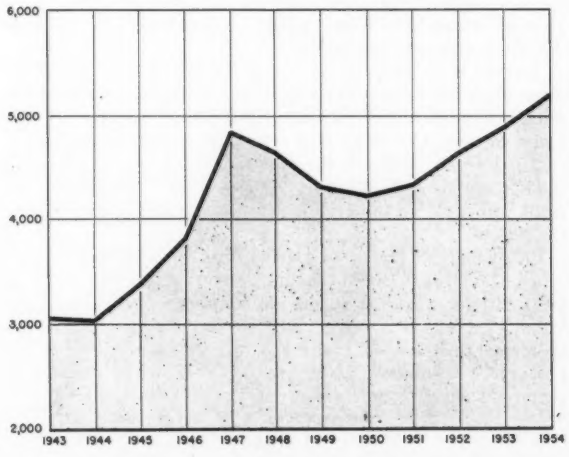

Fig. 1.—Number of members, American Statistical Association, 1943–1954

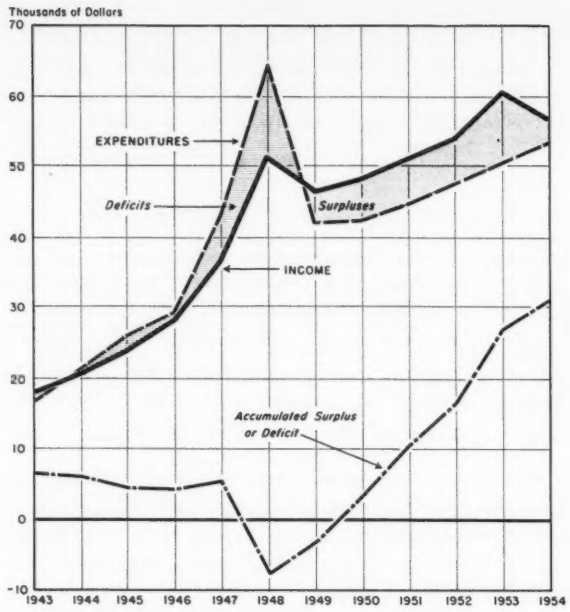

Fig. 2.—Income, expenditures, and cumulative surplus or deficit, American Statistical Association, 1943–1954

Association adequate financial freedom to undertake special programs as the need arises. It should be noted that the accumulation of surpluses has had no adverse effect on ASA's present operations. This is particularly well illustrated by the publications program: The *Journal of the American Statistical Association* published 934 pages in 1954, as compared with 590 pages in 1949—an increase of 58 percent. *The American Statistician* has also increased in size. In addition, the Association has recently published the monograph on *Statistical Problems of the Kinsey Report*, by William G. Cochran, Frederick Mosteller, and John W. Tukey, the *Proceedings of the Business and Economic Statistics Section*, and the 1954 Membership Directory.

Geographical Distribution of ASA Members

Nearly 90 percent of present ASA members are located in the continental United States (Table 2). They represent every State and the District of Columbia. The 10 percent outside the U. S. are located on six continents. They represent four U. S. possessions and 52 foreign countries.[2]

[2] An analysis of the geographical distribution of the members of each section of the ASA—by U. S. and foreign and by region of the U. S.—showed that the distribution of each section varies by no more than 5.7 percentage points from the distribution of the Association as a whole.

TABLE 1

Financial Status of ASA, 1940–1954

Year	Income	Expenditures	Annual Surplus or Deficit	Accumulated Surplus or Deficit	Centenary Fund
1940	$23,656	$24,640	$−984	$4,967	$4,450
1941	23,635	23,274	361	4,974[a]	3,618
1942	19,633	19,272	361	5,312[b]	4,802
1943	18,342	17,242	1,100	6,400	5,670
1944	20,871	21,145	−274	6,116	6,114
1945	24,420	25,942	−1,522	4,594	6,255
1946	29,212	29,558	−346	4,248	6,376
1947	37,014	42,134	−5,120	5,508[c]	[c]
1948	51,320	64,605	−13,285	−7,777	
1949	46,780	42,083	4,697	−3,080	
1950	48,512	42,114	6,398	3,318	
1951	51,575	44,458	7,117	10,435	
1952	54,061	47,529	6,532	16,967	
1953	60,377	50,433	9,944	26,911	
1954[d]	59,250	55,260	3,990	30,901	

[a] $355 from sale of Index transferred to Centenary Fund.
[b] $23 from sale of Index transferred to Centenary Fund.
[c] Centenary Fund transferred to general balance: $6,380.
[d] Estimated.

TABLE 2

Geographical Distribution of 1954 ASA Membership

	No. of Members	Percent
Total reporting	5,115	100.0
United States[a]	4,595	89.8
New England	264	5.2
Middle Atlantic	1,505	29.4
East North Central	861	16.8
West North Central	209	4.1
South Atlantic	1,072	21.0
East South Central	66	1.3
West South Central	173	3.4
Mountain	83	1.6
Pacific	362	7.1
Foreign	520	10.2
North America (except U. S.), Central America, and Hawaii	190	3.7
South America	47	0.9
Europe	212	4.1
Asia	46	0.9
Africa	14	0.3
Australia and New Zealand	11	0.2

[a] The States included in the nine regions of the U. S. are as follows: (1) *New England:* Conn., Me., Mass., N. H., R. I., Vt. (2) *Middle Atlantic:* N. J., N. Y., Pa. (3) *East North Central:* Ill., Ind., Mich., Ohio, Wisc. (4) *West North Central:* Iowa, Kans., Minn., Mo., Nebr., N. D., S. D. (5) *South Atlantic:* Del., D. C., Fla., Ga., Md., N. C., S. C., Va., W. Va. (6) *East South Central:* Ala., Ky., Miss., Tenn. (7) *West South Central:* Ark., La., Okla., Tex. (8) *Mountain:* Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo. (9) *Pacific:* Calif., Ore., Wash.

The geographical distribution of the ASA membership has changed a great deal in the past 60 years (Table 3). In 1893, New England accounted for over

36 percent of the total membership—reflecting the fact that the Association was started in Boston. At present, only five percent of ASA members are located in New England. Since 1926, the Middle Atlantic States have had the largest membership of any area; their relative importance, however, has declined during this period from 45.8 to 29.4 percent. There has been a notable increase in membership in the States west of the Mississippi (included in the category "other areas" in Table 3), which now comprise over 16 percent of the total membership, and in foreign membership, now over 10 percent. These shifts in geographical distribution reflect, of course, the very great increase in the use of statistics in various parts of the world; and the fact that ASA's total membership has increased tenfold since 1893 is indicative of the over-all growth of the statistical field.

TABLE 3

Shift in Geographical Distribution of ASA Membership Since 1893[a]

Area	1893	1926	1940	1945	1954
Number of members	504	629	2,644	3,307	5,115
Percent of members in					
New England	36.4	11.9	6.4	4.9	5.2
Middle Atlantic	28.4	45.8	35.6	31.5	29.4
East North Central	12.7	18.6	13.3	12.4	16.8
South Atlantic	10.5	13.4	29.3	31.2	21.0
Other areas[b]	12.0	10.3	15.4	20.0	27.6

[a] Data for 1893–1945 are taken from Hurwitz and Mann, *op. cit.*, p. 169. The States comprising each region of the U. S. are listed in the footnote to Table 2.

[b] Includes remainder of U. S. and all memberships outside U. S.

Sectional Membership

More than 94 percent of ASA members belong to one or more sections of the Association (Table 4). Forty-seven percent belong to two or more sections, and 14 percent to three or more. Sixty-seven members reporting (1.4 percent) belong to all five sections.

TABLE 4

Distribution of 1954 ASA Membership by Sectional Interest and by Number of Sections Interested in

No. of Sections Interested in	Total No. of Members	Percent	No. of Members by Sections				
			Bus. & Econ.	Training	Biometrics	Social Statistics	Phys. & Eng. Sci.
0	260	*5.6*					
1	2,213	*47.3*	1,472	47	211	281	202
2	1,535	*32.8*	1,018	490	370	810	382
3	511	*10.9*	357	369	242	344	221
4	88	*1.9*	71	71	62	74	74
5	67	*1.4*	67	67	67	67	67
Total reporting..	4,674	*100.0*	2,985	1,044	952	1,576	946
Percent ...	*100.0*		*63.8*	*22.3*	*20.4*	*33.7*	*20.2*

The largest sectional membership is held by the Business and Economic Statistics Section; nearly 64 percent of all ASA members belong to it. The Social Statistics Section ranks second with a membership of over 33 percent. Each of the other three sections—the Section on Training in Statistics, the Biometrics Section, and the Section on Physical and Engineering Sciences (formerly the Committee on Statistics in the Physical Sciences)—includes more than 20 percent of the total ASA membership.

The amount of overlap among the five sections and the amount of exclusive membership of each section are shown in Table 5. The Business and Economic Statistics Section has the largest membership belonging exclusively to any section—both in actual numbers (1,472) and in percent of its membership (49.3). The Section on Training in Statistics has the smallest; only 47 ASA members, representing 4.5 percent of the section's membership, belong exclusively to this section. This is illustrative of the fact that interest in training cuts across all areas of specialized subject-matter interest.

The largest overlap in sectional memberships is between the Business and Economic Statistics Section and the Social Statistics Section; 923 ASA members

TABLE 5

Overlapping Sectional Memberships of 1954 ASA Members

Members of			Overlapping Memberships with											
			No other section		Business & Economic		Training		Biometrics		Social Statistics		Physical & Engineering Sciences	
Section	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Business & Economic	2,985	*100.0*	1,472	*49.3*			609	*20.4*	271	*9.1*	923	*30.9*	410	*13.7*
Training	1,044	*100.0*	47	*4.5*	609	*58.3*			312	*29.9*	465	*44.5*	323	*30.9*
Biometrics	952	*100.0*	211	*22.2*	271	*28.5*	312	*32.8*			372	*39.1*	353	*37.1*
Social Statistics	1,576	*100.0*	281	*17.8*	923	*58.6*	465	*29.5*	372	*23.6*			228	*14.5*
Physical & Engineering Sciences	946	*100.0*	202	*21.4*	410	*43.3*	323	*34.1*	353	*37.3*	228	*24.1*		

belong to both. The smallest overlap is between the Social Statistics Section and the Section on Physical and Engineering Sciences; they have a joint membership of only 228. It is notable, however, that this figure represents almost one-fourth of the membership of the latter section.

Membership in Other Associations

ASA members hold an average of 1.9 memberships per member in other professional associations. Over 25 percent belong to one other association; over 21 percent to two; and over 12 percent to three (Table 6).

TABLE 6

Distribution of 1954 ASA Membership by Number of Other Associations Affiliated with

No. of Other Assns. Affiliated with	ASA Members	
	Number	Percent
0	1,144	24.48
1	1,197	25.61
2	985	21.07
3	590	12.62
4	341	7.30
5	184	3.94
6	113	2.42
7	56	1.20
8	29	0.62
9	16	0.34
10	9	0.19
11	4	0.09
12	5	0.11
14	1	0.02
Total reporting	4,674	100.00

Membership in four or more other associations is held by 16 percent of the ASA membership. One member reported belonging to 14 other associations. Although in 1945 over one-third of the ASA membership belonged exclusively to ASA,[3] this figure has now decreased to less than one-fourth. This is indicative of the rapidly increasing interest in statistics in various substantive fields.

The number of ASA members belonging to 20 specific other associations is shown in Table 7. The six associations to which the largest number of ASA members belong, and the percent of ASA members belonging to them, are the following: American Economic Association, 21.2 percent; Institute of Mathematical Statistics, 16.3 percent; American Association for the Advancement of Science, 11.8 percent; American Marketing Association, 10.1 percent; Biometric Society, 9.9 percent; and Econometric Society, 9.4 percent.

[3] Hurwitz and Mann, *op. cit.*, p. 165.

TABLE 7

Distribution of 1954 ASA Membership by Membership in Other Associations

Association	Belonging to One or More Other Assns.		Belonging to Only One Other Assn.	
	Number	Percent	Number	Percent
Amer. Accounting Assn.	51	1.1	3	0.1
Amer. Assn. for the Advancement of Science	553	11.8	24	0.5
Amer. Economic Assn.	992	21.2	269	5.8
Amer. Finance Assn.	111	2.4	7	0.1
Amer. Management Assn.	116	2.5	8	0.2
Amer. Marketing Assn.	471	10.1	158	3.4
Amer. Political Science Assn.	61	1.3	9	0.2
Amer. Psychological Assn.	278	5.9	34	0.7
Amer. Public Health Assn.	216	4.6	56	1.2
Amer. Soc. for Quality Control	352	7.5	86	1.8
Amer. Sociological Soc.	207	4.4	18	0.4
Assn. for Computing Machinery	62	1.3	8	0.2
Biometric Soc.	462	9.9	45	0.9
Econometric Soc.	438	9.4	30	0.6
Industrial Relations Research Soc.	109	2.3	13	0.3
Institute of Mathematical Statistics	761	16.3	143	3.1
Operations Research Soc. of America	144	3.1	12	0.3
Population Assn. of America	187	4.0	10	0.2
Psychometric Soc.	195	4.2	6	0.1
Rural Sociological Soc.	23	0.5	0	0
Other associations	3,086[a]	66.0	258	5.5
Total memberships	8,875	189.8	1,197	25.6
Total ASA members reporting	4,674	100.0	1,197	25.6
Average No. of memberships per ASA member	1.9	—	1.0	—

[a] This figure represents the number of memberships held in other associations rather than the number of members holding such memberships.

Table 7 also presents data on ASA members who belong to only one other association. The largest memberships held by this group of members are in the American Economic Association, the American Marketing Association, and the Institute of Mathematical Statistics.

Affiliation with other associations by sections of the ASA is shown in Table 8. The largest single overlap for each section is as follows: (a) Business and Economics Statistics Section and American Economic Association, 933 joint members; (b) Section on Training in Statistics and Institute of Mathematical Statistics, 327 members; (c) Biometrics Section and Biometric Society, 388 members; (d) Social Statistics Section and American

Economic Association, 304 members; and (e) Section on Physical and Engineering Sciences and Institute of Mathematical Statistics, 403 members.

TABLE 8

Distribution of 1954 ASA Membership by Membership in Other Associations and by Sectional Membership

Association	Bus. & Econ.	Training	Biometrics	Social Statistics	Phys. & Eng. Sci.
Amer. Accounting Assn.	49	16	0	7	1
Amer. Assn. for the Advancement of Science	238	151	225	257	138
Amer. Economic Assn.	933	188	34	304	51
Amer. Finance Assn.	110	12	3	17	4
Amer. Management Assn.	105	16	7	36	11
Amer. Marketing Assn.	445	66	30	147	28
Amer. Political Science Assn.	46	5	3	14	3
Amer. Psychological Assn.	50	81	100	218	20
Amer. Public Health Assn.	22	42	165	113	15
Amer. Soc. for Quality Control	184	118	102	52	239
Amer. Sociological Assn.	68	50	32	195	7
Assn. for Computing Machinery	36	20	16	14	34
Biometric Society	109	171	388	124	200
Econometric Soc.	374	157	87	156	103
Industrial Relations Research Assn.	93	15	6	69	
Institute of Mathematical Statistics	301	327	342	238	403
Operations Research Soc. of America	96	37	37	35	79
Population Assn. of America	63	42	58	150	3
Psychometric Soc.	29	83	84	147	23
Rural Sociological Soc.	6	3	2	20	
Other associations	1,692	915	868	1,206	875
Total memberships	5,049	2,515	2,589	3,519	2,237
Total ASA members reporting	2,985	1,044	952	1,576	946
Average no. of memberships per ASA member	1.7	2.4	2.7	2.2	2.4

The members of the Business and Economic Statistics Section, the largest of the five sections, hold the most memberships in other associations: 5,049. The members of the Biometrics Section have the highest average number of memberships in other associations: 2.7 per member.

Table 9 shows the relationship between number of other associations affiliated with and number of sectional memberships. As can be seen from the table, there is a high correlation between these variables. Thus, an ASA member who belongs to a relatively large number of other associations is also likely to belong to a relatively large number of sections of the ASA, and, conversely, the more sections a member belongs to, the more other associations he is also likely to belong to.

TABLE 9

Average Number of Sectional Memberships per ASA Member by Number of Other Associations Affiliated with

No. of Other Assns.	No. of ASA Members Belonging	No. of Section Memberships	Average No. of Section Memberships per Member
0	1,144	1,585	1.4
1	1,197	1,830	1.5
2	985	1,598	1.6
3	590	1,019	1.7
4	341	613	1.8
5	184	368	2.0
6	113	241	2.1
7	56	102	1.8
8	29	58	2.0
9	16	37	2.3
10	9	21	2.3
11	4	15	3.8
12	5	11	2.2
14	1	5	5.0
Total	4,674	7,503	1.6

In summary: The American Statistical Association now has the largest membership and the largest financial surplus in its history. Its members are quite active, both in the Association and in other professional societies. Since the trends of the past few years show every promise of continuing, the Association can look forward to still further growth.

IN DEFENSE OF FREQUENCIES*

JOHN E. FREUND and IRWIN MILLER

Department of Statistics,
Virginia Polytechnic Institute

One of the most controversial questions of scientific philosophy is that of assigning a meaning (i.e., an interpretation) to the term "probability". This question is of special interest to statisticians because probabilities form the foundation of a considerable part of their professional work. In order to avoid misunderstanding, let us point out that we are not concerned here with the problem of formulating an axiomatic definition of probability; this has been solved by Kolmogorov and others. Our question is that of coordinating the elements of such an axiomatic system with reality.

Most statisticians, when asked, will agree that they subscribe to a more or less statistical interpretation of probability, defining this concept rather vaguely as "the number approached by a relative frequency in a long sequence of trials." More precisely, in the frequency theory we define probability as *the limit of the relative frequency of "successes" in an infinite sequence of "trials"*. For example, if we denote the occurrence and non-occurrence of a certain event with the attributes A and $\bar{A}$ (non-A), respectively, the probability of A, or the probability of the occurrence of the corresponding event, is given by the limit of the relative frequency of A's within a sequence of the form

$$A\ \bar{A}\ \bar{A}\ A\ \bar{A}\ A\ A\ A\ A\ \bar{A}\ A\ \bar{A}\ \bar{A}\ A\ A\ \cdots$$

What is sometimes overlooked is that, if probabilities are thus defined, it is impossible to *know* the exact numerical value of a probability. Of course, we can *assume* that a probability equals some constant, but otherwise we can only *estimate* it on the basis of finite sequences of trials.

The fact that we can never be *certain* about the exact value of a probability has led to some of the most severe criticism raised against the frequency interpretation. Although most people will agree that there are many situations in which a probability concept must replace that of absolute falsity or truth, they are willing to go along with this only as long as they are allowed to be certain at least about probabilities. Most people will admit that some kind of probability is needed in the formulation of the foundations of science. However, few are willing to go all the way and face the fact that *one cannot be certain even about probabilities.* This attitude has been responsible for the formulation of alternate theories in which probabilities are interpreted in a non-statistical way.

In view of the fact that we cannot be *certain* about probabilities, we are led immediately to the question whether estimates of probabilities are correct or, at least, close. In other words, if we claim that *"the probability it will rain tomorrow is* 0.42," we are forced to ask immediately *"what is the probability that the probability it will rain tomorrow is* 0.42?" More realistically, perhaps, we might ask *"what is the probability that the probability it will rain tomorrow is* 0.42 ± 0.02?"

Although it may seem that we have carried this far enough there are additional questions which might be asked. Since we cannot be certain even about a statement of the form *"the probability that the probability of event A is* $p \pm \epsilon$ *is* q," we shall have to continue this process and ask *"what is the probability that the probability that the probability of event A is* $p \pm \epsilon$, *is* $q \pm \delta$, *is* r?"

This illustrates the widely criticized consequence of the frequency theory of probability, namely, that it leads to probabilities about probabilities about probabilities $\cdots$; in other words, that it leads to an infinite hierarchy of probabilities.

There are two ways in which this difficulty can be resolved. First, we can dispense with the frequency interpretation and substitute an alternative concept of probability. Otherwise, we can investigate whether we can justify cutting the infinite chain of probabilities at some point, while still interpreting each probability in the frequency sense.

A point of view which is currently fashionable among logicians and gaining popularity even among statisticians is that of defining probability as a *logical relationship between propositions.* (In order to avoid

* Research sponsored by the Office of Ordnance, U. S. Army, Contract No. DA-36-034-ORD-1527RD.

misunderstandings, logical probabilities are referred to by the name of "probability$_1$" while frequency probabilities are referred to as "probability$_2$".)

To illustrate what is meant by a probability$_1$ let us suppose that we are given some evidence E in support of a given hypothesis H. The probability$_1$ $P(H \mid E)$ is then defined as a logical relationship between the propositions "the hypothesis is H" and "the evidence is E." The expression "logical relationship" as it is used here presupposes the construction of an axiomatic system on the basis of which a numerical value can be assigned to $P(H \mid E)$ for all possible H and E.

Ignoring the difficulties involved in the construction of such a system, let us investigate for a moment where it will lead. Let us suppose, for example, that by using such a system we have arrived at the result that the probability$_1$ in question is 0.65. (This numerical result was obtained by using a formula supplied by the system.) What can we now say about the statement "$P(H \mid E) = 0.65$?" Is it true? Is it false? Is it probable?

The answer to this question is that any statement referring to a probability$_1$ is either *true or false*. Unless we qualify this immediately, it might seem as if the logical concept of probability thus solves all of our problems. *After all, does it not put us in the position where we can be certain at least about probabilities?* Unfortunately, the problem is not as easy as that; we must see what is meant here by "true" and "false". As these words are used with reference to a probability$_1$ they merely tell us whether the numerical value was calculated according to the rules of the "game". If we play along, and calculate $P(H \mid E)$ according to the rules, we are allowed to say that the statement "$P(H \mid E) = 0.65$" is *true*. If on the other hand, we do something which violates the rules of the "game", the statement is *false*. It follows that the kind of "truth" we assign to statements about logical probability is about as significant as the truth of the statement "*Either today is Sunday, or it is not!*"

With due respect let us add that most supporters of the logical concept of probability are the first to admit that their probabilities have no *factual content* and, hence, no *empirical meaning*.* This raises the obvious question why should a statistician or, for that matter, why should anybody seriously consider probabilities of this type. The construction of such a system of logical probabilities requires *a priori* assumptions which are of the same nature (and to us equally distasteful) as Laplace's "indifference" principle, also known as the principle of "equally distributed ignorance." Regardless of whether this fact is disguised by talking in a more sophisticated way about the structure of language, logical probabilities are little more than a crutch for those who are unwilling to cope with an empicial philosophy.†

Let us now examine whether it is really necessary to consider a hierarchy of probabilities in connection with the frequency interpretation. As we have said before, one never knows the *exact* numerical value of a probability and, hence, one cannot ignore questions about the "goodness" of its estimate.

If we try to make a statement of the form "the probability that p lies in the interval 0.42 ± 0.02 is q," we run into immediate difficulties because q will have to be evaluated by means of the Rule of Bayes. Due to the fact that we shall want to interpret each probability appearing in this formula in the frequency sense we require a great amount of collateral information which, unfortunately, is seldom available. Even if we had all of the necessary information to estimate q with the Rule of Bayes, the same problem would arise again the moment we try to make a probability statement about q. Sooner or later we reach a point where adequate collateral information is no longer available.

In view of the technical difficulties involved in considering hierarchies of probabilities it would seem desirable to cut this chain at some point and yet interpret each probability in the frequency sense. This is usually done by substituting a probability statement about the *interval* 0.42 ± 0.02 for the direct probability statement about p. In other words, we discuss the merits of our interval estimate indirectly by evaluating the method with which it was obtained.

An interval such as 0.42 ± 0.02 is usually referred to as a confidence interval and is assigned a degree of confidence, say, 0.95. This simply means that we are using a method of estimation which will provide us with intervals that, in the long run, "do their job" 95 per cent of the time. By its very nature the degree of confidence is a probability in the frequency sense.

In practice we often cut the chain at this point, limiting ourselves in this way to an estimate of p and a measure of the goodness of the method of estimation. Logically speaking, there are additional questions that must be taken into consideration. How sure are we, for example, that our method of estimation will actually work 95 per cent of the time?

The degree of confidence which we assign to our estimate of p is not an estimate in itself; it is a theoretical value. Hence all questions about the accuracy of 0.95 can be answered only with reference to the suitability of the mathematical model on which it is based. If we ask how sure we are that our method of estimation

* G. T. Tintner, "Foundations of Probability and Statistical Inference," *Journal of the Royal Statistcal Society*, Series A, Part III, 1949.

† See the discussion of the above mentioned paper by G. T. Tintner.

will work with a probability of 0.95, we are really asking how sure we are that we are using an appropriate model.

There are two types of questions that can be asked with regard to the assessment of this kind of model: first, we can ask whether p actually exists, i.e., whether it is reasonable to use a model which postulates the existence of the limit of the relative frequency; second, assuming that it exists, we can ask whether this limit is approached as rapidly as we assumed in the calculation of 0.95. With regard to the second question, we usually make the assumption that the convergence of our sequence is that of a sequence of Bernoulli trials. In that case the degree of confidence is exact. If we wanted to make different assumptions about the convergence of the sequence, we could compute a corresponding degree of confidence, which would again be exact.

How do we know that it is reasonable to postulate the existence of the limit? Of course, we have no guarantees, but if there were no sequences displaying at least some signs of convergence there would be no solution to the problem of prediction; we could not predict the future on the basis of past events. In other words, the existence of sequences displaying signs of convergence, at least within the initial section which, after all, is the only part of concern to human beings, is a *necessary condition* for scientific predictions.

We are, therefore, forced to make the following choice: either we make no predictions based on the past without a guarantee that they will work, (we make no predictions at all on the basis of past experience) or we gladly make whatever assumptions are *necessary conditions* for success. It seems hardly necessary to explain our preference for the second choice. If we exclude the possibility of predictions based on past experience there would be no science, and there would be no statistics.

Incidentally, there are many situations in which we can go one step further. If we have collateral information about the convergence of similar types of sequences we can estimate the probability that a given sequence will converge. For example, having tossed many coins in the past and having observed that the resulting sequences seem to display properties of convergence, we can estimate the probability that the sequence will converge. Of course, we must then consider sequences of sequences and the problems which we discussed before will now arise on a higher level.

Some of those who are dissatisfied with the frequency theory of probability subscribe to what is called a *personalistic view*. They *define* probabilities as measures of the confidence that an individual has in the truth of a particular proposition.*

* Leonard J. Savage, *The Foundations of Statistics*. New York: Wiley, 1954.

Of course, "probability" is just a word which may be arbitrarily defined, but it is generally conceded that a useful interpretation of probabilities must be closely tied to problems of prediction and decision. We shall, therefore, have to ask whether the subjective personalistic view provides a basis for a meaningful theory of prediction and decision. In other words, we must ask how one can evaluate the "goodness" of subjective probabilities, and how subjective probabilities can be verified.

With regard to the problem of verification, some critics of the personalistic view have expressed the opinion that, since their probabilities are subjective, they can be verified only by asking the persons quoting them if this is actually how they feel. In this sense, the subjective probabilities tell us something about the emotional and general condition of the persons whose subjective feelings they are supposed to express. Hence, they tell us more about the persons than about the objective situations.

Supporters of the personalistic view make the qualification that the individual concerned must in some ways be "reasonable". For example, he must be consistent so that he will not quote a probability of 0.5 in the morning and without further evidence and for no apparent reason quote 0.7 in the evening. If we demand that the person who states subjective probabilities is "reasonable" there must be some way in which we can test or evaluate the "reasonableness" of an individual. Let us suppose, for example, that a business executive hires a statistician for the purpose of supplying him with probabilities on which he can base his decisions. Naturally, he wants to know whether his statistician may be described as "reasonable." How could he check? For example, he could take all of the cases where his statistician gave him a subjective probability of 0.9 and where he acted accordingly. If his statistician had supplied him with high probabilities for events out of which only 10 per cent came out as predicted he would most certainly replace him with a "more reasonable" person. This means that in order to verify whether subjective probabilities are "reasonable" we shall have to resort again to a frequency interpretation. The business executive can decide the issue of "reasonableness" only after his statistician has provided him with a sufficient number of probabilities.

In modern science the problem of meaning is very closely related to that of verifiability, i.e., the meaning of a statement depends on its method of verification. It follows that in order to verify subjective probabilities without actually having to ask a person "how he feels", we shall have to give subjective probabilities a frequency interpretation. Hence, it is possible to use subjective methods of *estimating* probabilities but, as we have seen, it is still necessary to *define* them in the

(*Continued on page 27*)

INSTRUCTION IN STATISTICS IN THE COLLEGES AND UNIVERSITIES OF THE SOUTH

H. H. CHAPMAN

School of Commerce and Business Administration, University of Alabama

As a first step in aiding the colleges and universities of the South to develop adequate and sound programs in statistics, the Southern Regional Education Board sponsored the first Southern Regional Conference on Statistics which was held in Atlanta, October 3 and 4, 1952. To implement the recommendations of the conference, the Board then appointed an Advisory Commission on Statistics consisting of thirteen members selected from the faculties of the colleges and universities of the region. The inventory of instruction, research, and facilities in the colleges and universities of the South was conducted under the general supervision of this Commission. The collection of the data and the preparation of the report was done during the academic year 1953–54. The report was presented at the Second Southern Regional Conference on Statistics held in Roanoke, Virginia, July 8–10, 1954.

The information for the inventory was obtained largely by questionnaire, although college and university catalogues and announcements and special bulletins were examined to provide supplementary data. Several visits were made to institutions but time permitted only limited personal inspection of facilities. The main source of information was a detailed questionnaire which was sent to the member of the faculty or staff of each college or university who had been designated by its president as the contact person. After a lapse of some two months, a simplified one-page questionnaire was sent to those institutions (largely small colleges) which had not replied. Then after the inventory was well under way, a list of one hundred names was selected at random from the teachers of courses in statistics as reported and a questionnaire was sent to these selected teachers asking them to answer a series of questions designed to secure expressions of their opinions concerning methods of providing instruction in statistics.

As is shown by Table 1, the response to the questionnaire was excellent. The same can be said concerning the numerous letters that were written to clear up points where reports were incomplete or ambiguous or where additional information was desired. Of the one hundred teachers of statistics to whom the opinion questionnaire was sent, seventy replied.

TABLE 1

Number of Colleges and Universities in the South Invited to Participate in Inventory, Number to Whom Questionnaire was Sent and Number of Replies

State	Number Invited	Number of Question-naires	Number of Replies
Alabama	17	15	15
Arkansas	10	7	6
Florida	11	10	9
Georgia	22	17	16
Kentucky	16	15	13
Louisiana	15	12	11
Maryland	19	13	12
Mississippi	12	5	5
North Carolina	30	25	25
Oklahoma	14	8	6
South Carolina	18	14	12
Tennessee	24	19	17
Texas	39	28	28
Virginia	25	21	18
Totals	272	209	193

Tables 1, 2, 3, and 4 show that the institutions were well distributed geographically among the fourteen states of the region and included both small colleges and large universities. The smaller institutions generally were of the liberal arts or general college type while the larger institutions had a wide variety of specialized departments and professional schools. Seventy-seven reported that they granted masters degrees in at least one field and thirty-six were offering graduate programs leading to Ph.D. degrees. The inventory thus included a very high percentage of the colleges and universities of the South and also covered a wide diversity of types of institutions.

TABLE 2

Number of Reporting Institutions by Size of Stated Enrollment of Students

Number of Students Enrolled	Number of Institutions
Less than 500	55
500 to 999	54
1000 to 1999	37
2000 to 2999	16
3000 to 3999	6
4000 to 4999	7
5000 and over	18
Total	193

TABLE 3

Organization of Reporting Institutions into Schools or Colleges

School or College	Number of Institutions with Indicated School or College
Total number of institutions	193
Number for which information was not available	20
Number for which information was available	173
Arts and science or general college	168
Agriculture	26
Business Administration	45
Chemistry	4
Dentistry	9
Education	44
Engineering	37
Home Economics	25
Law	32
Medicine	18
Nursing	20
Public Health	2
Graduate	64

TABLE 4

Degrees Granted by 173 of the Reporting Institutions

Degree Granted	Number of Institutions Granting Indicated Degree
Bachelor's degrees—B.A. and/or B.S.	172
Master's degrees	77
Doctor of Philosophy—Ph.D.	36
Bachelor of Law—LL.B.	32
Doctor of Dental Surgery—D.D.S.	9
Doctor of Medicine—M.D.	18
Doctor of Education—Ed.D.	21

Offerings in Statistics

One of the very serious questions that was confronted in the inventory was that of arriving at satisfactory criteria as to what constituted a course in statistics. It seemed impossible to get general acceptance of a definition and so the policy was followed of encouraging reporting on the basis of broad and liberal definitions rather than restricted ones. In the preparation of tabulations, however, the reported courses were divided into two categories: (1) statistics courses and (2) courses which apply statistics.

Generally courses designed to give instruction in statistical theory or statistical methods were considered as statistics courses. Several criteria were employed. If the title of the course included such words as statistics, statistical methods, or statistical techniques, the presumption was that it was a statistics course. A like presumption existed if the course was offered by a statistics department. Finally consideration was given to the course description. If it appeared that a substantial place was given to instruction in topics commonly included in statistics courses, the course was classified as statistics. If, on the other hand, it seemed that the primary interest was in subject-matter topics or problems and statistical methods were included as a means of solving problems and little or no instruction was given in statistical methods, the course was considered as one that applied statistics. In this article only information on the statistics courses will be presented.

As shown by Table 5, 157 of the 193 reporting institutions gave at least one course in statistics. The courses were offered in a wide variety of departments. More offerings (192 courses) were reported in mathematics than in any single department but the various departments included under economics and business administration reported 256. Other fields with numerous offerings were psychology, 83 courses; agriculture, 79; sociology and social work, 47; education, 38; engineering, 34; and public health, medicine, and nursing, 26. General departments of statistics set up to serve the whole institution occupied a relatively unimportant place as measured in the number of courses offered since such departments offered 70 courses.

TABLE 5

Number of Courses in Statistics Offered by the 193 Reporting Colleges and Universities

Number of Courses in Statistics	Number of Institutions
No course	36
One course	57
Two courses	40
Three to five courses	21
Six to ten courses	17
Eleven to twenty courses	10
Twenty-one and more courses	12
Total	193

Introductory Courses in Statistics

For the purposes of the tables which present the information on introductory courses (Tables 6, 7, 8, 9, and 10), an introductory course was defined as the

first course in statistics or statistical methods for which a student registers. Stated somewhat differently, the introductory courses include all those which do not assume that a student has had a previous course in statistics. In cases where a sequence of two courses, one each for two quarters or two semesters, was given with the title, "Introductory Statistics," or similar title, only the first course was classified as introductory.

In a very large proportion of the institutions, the student receives his first instruction in statistics in a course offered in his major department. This often means many introductory courses in the same institution or, in other words, widespread "duplication" of introductory courses. It also means a high degree of decentralization of instruction. The information presented in Tables 8, 9, and 10 indicates that introductory courses vary widely in their nature since they are designed for students with a variety of background preparation. From the point of view of formal mathematical training, the courses range from those which have no formal prerequisite to those which assume that a student has a mastery of differential and integral calculus. Also, the student level for which the course is designed varies from a few courses for freshmen to a substantial number of introductory courses for graduate students. These impressions are further supported by the textbooks reported as used in the introductory courses.

TABLE 6

Number of Introductory Courses Offered by the Reporting Colleges and Universities

Number of Introductory Courses	Number of Institutions Offering Indicated Number of Courses
One	43
Two	31
Three	15
Four	10
Five	6
Six	2
Seven	—
Eight	6
Nine	5
Ten	1
Thirteen	1
Total	120

TABLE 7

Departments in Colleges and Universities in Which Introductory Courses in Statistics are Offered

Department in Which Course is Offered	Number of Institutions
Agricultural school group	18
Business school group	59
Economics in arts and science colleges	18
Economics and sociology	3
Education group	43
Engineering group	13
Government	1
Mathematical statistics	3
Mathematics	100
Medical and biological group	20
Psychology	39
Social science	4
Sociology	26
School of social welfare	2
Statistics	12

NOTE: Where a course has been cross listed in two or more departments, the course was counted in each department.

TABLE 8

General Types of Prerequisites for Introductory Courses in Statistics

Types of Prerequisite	Number of Times Mentioned
No statement concerning prerequisite	59
No prerequisite	77
A mathematics prerequisite	143
Courses in a subject other than mathematics	
Economics	20
Psychology	20
Sociology	6
Some other specified subject	20
Class standing of student	
Sophomore	2
Junior	13
Senior	5
Advanced	1
Graduate	9
Consent of instructor	11

TABLE 9

Mathematics Prerequisites of Introductory Courses

Stated Mathematics Prerequisite	Number of Courses in Which Required
High school algebra	4
College algebra	49
Business mathematics and/or mathematics of finance	5
Algebra and business mathematics or mathematics of finance	4
Trigonometry	2
Algebra and trigonometry	13
Analytical geometry	3
Algebra, trigonometry and analytical geometry	10
Calculus	2
Calculus and analytical geometry	2
Calculus, algebra, trigonometry and analytical geometry	34
Integrated course in algebra, trigonometry, analytical geometry and calculus	6
Prescribed list of mathematics courses—algebra through calculus	1
Advanced mathematics — six semester hours	1
Basic mathematics for statistics—four quarter hours	1

TABLE 10

Student Level for Which Introductory Courses in Statistics Were Designed

Student Level of Course	Number of Courses
Information not available	32
Freshman	2
Sophomore	35
Freshman-sophomore	4
Junior	75
Senior	53
Junior-senior	43
Undergraduate	9
Upper division	4
Sophomore-junior-senior	2
Junior-senior-graduate	28
Advanced undergraduate-graduate	16
Senior-graduate	16
Graduate	42

Other Findings of the Inventory

The inventory also compiled information on the following topics: the place of statistics in the subject-matter fields; majors and specialized programs in statistics; facilities for instruction and research; and organization for statistics. Space, however, does not permit the presentation of the details on these subjects and so only brief summaries will be given.

The interest in statistics and the recognition of its place is evidenced by the frequency with which a minimum preparation in statistics is recommended or made a degree requirement in curricula in a wide range of fields of study. This constitutes one of the significant lines of development: namely, the idea that to be competent in a given field one needs an understanding of statistical methods beyond that which can be acquired casually.

In a very considerable number of institutions, opportunities for study of statistics are being provided by offering intermediate and advanced courses especially designed for students in a particular subject-matter field. Particularly in graduate study and in the training of research workers is the importance of a working knowledge of statistical methods being emphasized.

A rather surprisingly large number of universities in the region have made significant progress in developing programs of study for students who wish to acquire competence in doing statistical work. Two types of programs have been developed: the one places primary interest on a subject-matter field—such as business administration or public health—with a strong concentration on statistics; the other is primarily concerned with the training of specialists in statistics.

Many of the larger universities of the region have been able to provide specialized facilities for instruction and research to an extent which is quite impressive. Such facilities include collections of statistical journals and published source materials, calculating machines, laboratory and classroom equipment, and mechanical tabulating and computing installations. The inventory cannot indicate the adequacy of the facilities in any institution but it is evident that there are large differences in the special facilities provided by the various schools.

At least significant beginnings have been made in a number of universities, and much more than a beginning in several, in providing statistical services through contract research, statistical laboratories, short courses on special applications, and consultation. The developments in agriculture, business and economics, and medicine can be cited as examples.

The work in statistics in colleges and universities in the South is carried on largely on a decentralized basis. General or centralized departments of statistics are reported in only three institutions, Virginia Polytechnic Institute, North Carolina State College, and the University of North Carolina at Chapel Hill. Some centralized control or integration is attempted by university-wide committees on statistics in a few cases.

QUESTIONS AND ANSWERS

Edited by ERNEST RUBIN
U. S. Department of Commerce and American University

Some Problems in Soviet Statistics

Discussion by *NAUM JASNY*

The quagmire of Soviet statistics presents unusual problems to statisticians and economists. Statistics of Free World countries abound in various difficulties, primarily of a technical nature; those behind the Iron Curtain have built-in or superimposed limitations derived from political-administrative origins. The special biases of Soviet statistics defy the usual textbook approach. Current statistical figures, mainly in percentage form, are published as a comparison with the preceding year and against a vague and imprecise base year. Furthermore, the base year has the peculiar property of Orwellian history, being continually subject to revision. Persons engaged in working this particular area deserve a special dispensation from the statistical fraternity because the obstacles therein are truly extraordinary. Dr. Naum Jasny, who for many years has studied the development of the Soviet economy, has kindly prepared the following discussion on some of the perplexities of Soviet statistical data.

Gross industrial production.—The index of gross industrial production was calculated in terms of 1926–27 prices for the period 1928 through 1950. Since 1930 this index has tended to exaggerate the rates of growth. The upward bias arose because of the weighting treatment of new goods in this index. For the purpose of the index, new goods were estimated at or near the prices of the year of their introduction. Since the Soviet Union was experiencing great inflation from 1930 to 1948–49, this method of estimating the prices of new goods effected the upward bias.[1] The treatment of the new goods, however, does not entirely account for the behavior of the Soviet index of gross industrial production.

Entirely new goods involve primarily machinery. Since, on a value basis, machinery constitutes a large part of the gross output of producers' goods, it was commonly assumed that the official index for the output of these goods had a greater bias than the index for the output of consumers' goods. We must be grateful to Donald Hodgman for having dispelled this illusion. The exaggeration appears to have been largest, where such exaggeration was most needed, i.e., in the consumers' goods category. The following comparison shows the increase in output from 1928 to 1950 (1928 = 100) by type of goods:

	Official	Corrected[a]
Total production	1,099	470
Producers' goods	1,821	880
Consumers' goods	501	200

[a] Estimates of this writer at real 1926–27 prices. So far as consumers' goods are concerned, they are largely based on Hodgman's index.

The index of gross industrial production in 1926–27 prices possesses additional remarkable properties. This index displayed only a moderate upward bias in years when industrial expansion was large and a great upward bias in poor years. According to official data, gross industrial output increased by 85 percent in the three years 1933–36; this figure is 20 percent higher than that obtained by independent investigation. In the three years 1937 through 1940, the output rose by 43 percent, officially; however, independent analysis places the increase between 10 and 15 percent.

Since January 1, 1951, the index of gross industrial production is computed at wholesale prices less turnover tax as of January 1, 1952. This writer is unable to find anything wrong in the official description of the preparation of the index. A check of the index figures for 1951–53 by Hodgman (unfortunately on the basis of an inadequate sample of only 18 commodities) yields an increase only about 10 percent smaller than that shown by official data. However, seeing the fantastically false claims made in such sources as the publications of the Academy of Sciences of the U.S.S.R. (see samples under private incomes below), one must continue to be on guard.

The greatly exaggerated index figures for gross industrial production in 1926–27 prices for the years prior to 1950 were not recomputed in the new price

[1] The price level in 1926–1927 was substantially lower than that in the period 1930–1949. The effect of this retroactive technique was to inflate the index thereby misrepresenting real or actual production in the thirties and forties. Furthermore, it is the usual experience that entirely new goods cost more in the early period of production.

pattern after the official index had been shifted to 1952 prices. When it is claimed that industrial production expanded 15-fold from 1928 to 1953, the figure is composed of the 11-fold increase in 1928–50 (old index) and of a 41 percent increase in 1950–53 (new index).

Crop production.—Prior to 1933 official Russian statistics on crops harvested were based on crops brought to the barn for storage, usually referred to in Russia as "the barn crop". Since 1933, however, instead of reporting data on the extent of the harvested crops, Soviet statistics began to report annually the theoretical grain stand determined in the field prior to the harvest. At first a 10 percent discount for losses was allowed, but this was abolished since 1937. Between 1937 to 1939 this procedure was extended to all other crops. The yield so determined was first referred to as "biological" but then a shift was made—in complete disregard of the meaning of the word—to the term "factual."

The estimates of the harvest in the field not only are inexact, but open the door to great exaggerations in excess of real losses. The degree of exaggeration varies from crop to crop. Interestingly it tends to be smaller in good years and larger in poor years. By analysing consumption, it was estimated that the official estimates of the 1950 and 1951 grain crops need a 26 percent discount to bring them down to the level of the former "barn crop."

In his significant report in August 1953, Malenkov pointed out that only the factual crops (factual without quotation marks) have any importance and that they are much smaller than those ascertained in the field. These remarks raised the expectation, as yet not materialized, that the Soviets intend to return to estimating the crops in barn yield terms.

For more than two decades figures in the magnitude of 124.5 million metric tons (as given, e.g., for the 1950 grain crop) were put into circulation. They were compared freely, without any discounts, with the crops obtained in the U.S.S.R. by the peasants prior to collectivisation and with those harvested by the farmers in the despised capitalist world. They served as the "proof" of the "immeasurable" superiority of the Soviet socialized farming. It is not simple to come out and announce that actually the 1950 grain crop amounted only to little more than 90 million tons or that the yields per acre obtained now are not higher than those harvested by more advanced Russian peasants 50 years ago.

National income.—The Soviets employ their own concept of national income. The Soviet concept of national income, following Marx, includes only material production (farm and industrial production, construction, transport of freight and trade turnover); services are omitted.

Since 1928, national income was computed on the basis of the so-called 1926–27 prices. It included:

a) Net industrial production in 1926–27 prices which was obtained from the value of gross industrial production by subtracting all costs including depreciation.

b) Net farm output in the same prices computed from the gross farm output[2] by deducting expenses (the same as in the case of industry). The crops were included in gross farm output in "biological" or "factual" terms. The expenses were apparently computed correctly until 1935 inclusive, except that in the estimates for 1933–35 no provision was probably made for losses of grain in excess of the allowed 10 percent.[3] By some trick, the expenses involved in farm production declined greatly in the 1937 estimate of national income with a corresponding boost of the contribution of agriculture to the latter (1937 was the last year when an estimate of the net agricultural production was announced; no announcement on this item was made for 1936).

c) The contribution of freight transportation to national income, only moderately exaggerated.

d) and e) The contributions of construction and of trade *in current prices* (!).

A 6-fold increase in national income from 1928 to 1950 is claimed officially. The highest independent estimate indicates an increase of less than 3-fold.

According to a text on economic statistics, the use of the 1926–27 prices was discontinued in the computations of national income.[4] The statement on it may possibly be regarded as a hint that 1952 prices are used in the present national income computation. Contrary to the situation with reference to the index of industrial production, the index of national income continues to be definitely exaggerated even after the abandonment of the 1926–27 prices. For example, the growth of national income in two years, 1951 and 1952, is estimated at 24.3 percent officially and at only 18–19 percent by this writer.

Moderate exaggerations are much more difficult to deal with than large exaggerated claims, e.g., that labor productivity in state and collective farms increased 3-fold since 1913. A finding that an official figure seems

[2] The Soviet concept of gross farm output is extremely obsolete. It includes all vegetable matter, except pasture, and all animal products, including manure, but excluding the value of draft work. Thus an immense amount of duplication is associated with incompleteness.

[3] For the present time, the practice of calculating the value of crops in "biological" terms in computing net agricultural production is acknowledged by M. Bor, "On National Income in a Socialist Society", *Questions of Economics*, 1954, No. 10, page 84.

[4] A. I. Gozulov, *Economic Statistics*, Moscow, 1953, page 380.

to be exaggerated by say 20 per cent leaves one in doubt that possibly something was missed and the official figure is correct after all. Unfortunately this writer has thus far been unsuccessful in finding a plausible reason, why the official estimates of national income for 1951 and 1952 are substantially higher than his.[5]

The greatly exaggerated estimates of national income in 1926–27 prices for the years 1928 until 1950 inclusive remain fully in use in the U.S.S.R., similar to the case of the index of gross industrial production.

Incomes.—"Statistics" of population income include obvious distortions, such as a 6-fold increase in real wages and a 6.8-fold increase of the real income of the peasants for the period 1913 to 1953. Possibly even more absurd is the claim that real wages more than doubled in only one year, from 1947 to 1948. These claims are found everywhere including the publications of the Academy of Sciences of the U.S.S.R. and the new official text on "political economy." The claim with reference to peasants' incomes is incidently a more than 10-fold exaggeration. There are other such claims, especially with reference to the gains since 1913. These claims absolutely defy analysis.

In some cases, as for example the claims of a 2.7-fold increase in peasants' income in 1932–37, it is possible to establish that the estimate announced as having been made in comparable prices, was actually based on the rapidly rising prices of the respective years. In at least one important case consumption of goods calculated in rising current prices, is given the appearance of data in physical terms. (The uncertainty whether the data are in physical or money terms, exists with reference to a large body of published material.)

Since 1930, the Soviets shifted to their own concept of real wages. Except for a short interruption in the late thirties, real wages have been defined as "real" income *per capita* of the wage earners and their families. No allowance is made for the fact that gainful employment of a married woman involves additional expenses. In addition to the paid-out wage a "socialized wage" is differentiated, which consists of social insurance and other similar benefits and of expenses of the state on health and education, the latter including expenditures on the apparatus of the Communist Party.

At present, official statements on real wages are presumably always in terms of per capita income of the wage earners and their families, inclusive of the socialized wage, although this latter fact is not clearly pointed out. Fortunately, the new text *Political Economy* (Moscow, 1954) gave the rise of the real wage from 1940 to 1953 inclusive and exclusive of the socialized wage. The real wage exclusive of the socialized wage is supposed to have risen by 65 percent over the period (p. 162). This writer has projected a rise of only 19 percent from 1940 to 1952 (estimate partly based on the computations of Mrs. Janet Chapman). On a per capita basis this is equivalent to a rise of 24 percent. For 1953 an increase in the real wage by 13 percent is claimed officially. Hence, if this claim is accepted,[6] the real paid-out wage on a per capita basis should have been 40 percent higher in 1953 than 1940. The officially claimed rise of 65 percent is still 18 percent higher than this.

It is suggested that, while the official sources on changes of prices, real wages, etc. since 1940, uniformly speak *of 1940 in general*, the computations are actually based on the prices on *December 31 of that year*. There was a large rise of prices of consumers' goods during 1940. The computed 18 percent fit well the approximate excess of the prices on December 31, 1940 over the weighted average prices in state and cooperative trade in the whole year of 1940 (with consideration of an unchanged house rent and of the cost of other services).

The more recent official claims with reference to rises in peasants' real incomes (in the U.S.S.R. real incomes never decline) are impenetrable, at least for this writer.

---

[5] According to Bor, *loc. cit.*, the value of the animal production is calculated for the purposes of establishing national income from the *planned* numbers of livestock and the *planned* yields per animal. The author acknowledges that in this way net farm output is more or less substantially exaggerated. However, if this doubtful procedure is used every year, *the rate of growth* need not necessarily be greatly exaggerated. But there is no reason to presume that this is the only departure from an orderly procedure. Furthermore, what holds good for computations of national income, is, or will be applicable for computations of gross industrial output.

[6] The claim is exaggerated in the opinion of this writer.

SECTION OFFICERS, COMMITTEES AND ASSOCIATION REPRESENTATIVES FOR 1955

SECTION OFFICERS

Biometric Section

Paul G. Homeyer—*Chairman*
I. D. J. Bross—*Chairman-Elect*
Virgil Anderson—*Secretary*
EXECUTIVE COMMITTEE
G. A. Baker
B. M. Bennett
B. G. Greenberg
Donald Mainland

Business & Economic Statistics Section

Clarence Long—*Chairman*
Kenneth B. Williams—*Chairman-Elect*
Geoffrey H. Moore—*Vice Chairman for Program*
Walter F. Ryan—*Vice Chairman for Publications*
Wesley D. Mitchell—*Vice Chairman for Regional Activities*
Robert E. Johnson—*Secretary-Treasurer*

Section on Training

John E. Freund—*Chairman*
Paul G. Homeyer—*Chairman-Elect*
EXECUTIVE COMMITTEE
D. G. CHAPMAN—1953–55
Boyd Harshbarger—1953–55
Rutledge Vining—1953–55
G. L. Edgett—1954–56
Fritz Kafka—1954–56
Paul Irick—1954–56

Social Statistics Section

S. L. Wolfbein—*Chairman*
Felix Moore—*Chairman-Elect*
Philip Hauser—*Vice Chairman*
Gladys Palmer—*Vice Chairman*
A. J. Jaffe—*Secretary*

Section on Physical & Engineering Sciences

Besse B. Day—*Chairman*
Jack Moshman—*Secretary*
EXECUTIVE COMMITTEE
Robert Bechhofer
Carl A. Bennett
Irving Burr
William R. Pabst, Jr.
Harold F. Weaver

COMMITTEES

Ad Hoc Committee to Explore Opinions on Standards

Wm. W. K. Freeman*

Advisory Committee to the Bureau of the Budget on Statistical Policy

W. G. Cochran*
Walter Hoadley, Jr.
Howard Jones
Isador Lubin
Wm. F. Ogburn
Frederick F. Stephan
Willard Thorp
Ralph J. Watkins
Samuel Wilks

Census Advisory Committee

Frederick F. Stephan*
Murray H. Benedict
John Boatwright
Leonard A. Drake
Lester R. Frankel
Howard Whipple Green
Arnold J. King
J. E. Morton
Donald S. Thompson
Frank J. Welch
P. K. Whelpton

Committee on Census Enumeration Areas

Howard Whipple Green*
F. A. Buechel
Sidney Cohen
Florence E. Cuttrell
Philip M. Hauser

Ex Officio

C. E. Batschelet
Howard G. Brunsman
C. A. Lemieux
Conrad Taeuber
Leon E. Truesdell

Committee on Abstracts

Armen A. Alchian*

Committee on Bibliography in Sampling

Benjamin J. Tepping*

Committee on Committees

Maxwell Conklin*
Samuel Hayes
Walter Hoadley, Jr.
Arnold King
Leslie Kish
Gladys L. Palmer

Committee on Data Sources

Frank A. Hanna*
W. F. Bloor
Dorothy S. Brady
M. I. Gershenson
Ralph R. Shaw
Morris B. Ullman

Committee on Elections

Gertrude M. Cox*
Walter Hoadley, Jr.
Stuart A. Rice

Committee on Fellows

Wm. G. Cochran*
A. Ross Eckler
Paul Olmstead
Helen Walker
Samuel S. Wilks

Finance Committee

Samuel Weiss*
Donald Riley
Alfred N. Watson

Committee on Institutional Membership

To be appointed

Committee on Monographs & Occasional Papers

Carl F. Kossack*
Robert Bechhofer
Jerome Cornfield
Alan S. Donnahoe
William R. Leonard
Almarin Phillips
W. Allen Wallis
Samuel Weiss

1955 Program Committee

Martin R. Gainsbrugh*
Cuthbert Daniel
John Freund
A. J. Jaffe
Boyd Harshbarger
O. Kempthorne
Rensis Likert
Herbert Marshall
Geoffrey Moore
Donald C. Riley
Henry Scheffe
John W. Tukey

Public Relations Committee

Will Lissner*
Herbert Bienstock
Henry P. Caulfield, Jr.
J. A. Livingston
John W. Love
A. Wilfred May
M. S. Rukeyser
De Ver Sholes

AMERICAN STATISTICAL ASSOCIATION REPRESENTATIVES

Council of the American Association for the Advancement of Science

W. G. Cochran
Paul S. Dwyer

American Standards Association—Z16 Accident Statistics

M. I. Gershenson
Jules V. Quint

American Standards Association—Office Procedure

W. Edwards Deming

American Standards Association—Y10 Letter Symbols

John W. Tukey

Inter-American Statistical Institute

Peyton Stapp

International Statistical Institute

Samuel Weiss

Board of Directors of the National Bureau of Economic Research

W. Allen Wallis

Social Science Research Council

Frederick Mosteller
Mortimer Spiegelman
Samuel S. Wilks

---

* Chairman

IN DEFENSE OF FREQUENCIES

Continued from page 17

frequency sense. This is by no means inconsistent with the objectivistic frequency view. The late Hans Reichenbach, one of the early proponents of the frequency theory, said:*

"... we often prefer an intuitive appraisal to a statistical enumeration. . . . The human mind is fortunate in being endowed with the ability of intuitive appraisal; in many cases the use of this talent leads to a better determination of probability values than the compilation of incomplete statistics."

The purpose of this paper has been to defend the frequency theory, essentially that proposed by Hans Reichenbach, against the specific criticism that it leads to a hierarchy of probabilities which can never be evaluated and, hence, make the whole concept useless. We have shown that the two alternative views, namely, those proposing logical and subjective probabilities do not provide an answer. Logical probabilities have no factual content and subjective probabilities have a scientific, i.e., verifiable, meaning only if they are taken as estimates of probabilities in the frequency sense. We have also shown that it is possible to avoid an infinite hierarchy of probabilities and yet interpret each probability according to the frequency definition. Of course, our answer will have little appeal for those who demand absolutes and are unwilling to settle for anything short of certainty even with regard to probabilities. Although we have to make assumptions about our models let us point out that these assumptions are self-correcting in as much as they are immediately changed as soon as experience shows their unsuitability for a given problem.

Having defended the frequency theory only against *one* of the major criticisms that have been leveled against it, this paper should not be misconstrued as being a complete defense of this theory. Some of the other criticisms will be discussed in a subsequent paper.*

* Hans Reichenbach, *The Theory of Probability*. Univ. of Calif. Press, 1949.

* A detailed discussion of the various probability concepts and an analysis of their relative merits may be found in: Ernest Nagel, "Principles of the Theory of Probability," *International Encyclopedia of Unified Science*, Vol. I, No. 6, Chicago, University of Chicago Press, 1939.

NEWS ABOUT MEMBERS

Asher Achinstein, formerly senior staff member with the Council of Economic Advisers, has resumed his duties with the Legislative Reference Service of the Library of Congress.

Maurice H. Belz has recently been promoted from Associate Professor to Professor of Statistics in the University of Melbourne. He has been in charge of the Department of Statistics since 1948 when it was created.

Gerald D. Berndt, formerly with the Quartermaster Research and Development Center at Natick, Massachusetts, is on a special assignment to the Advisory Committee on Weather Control in Washington, D. C.

William E. Bradford has returned to the Office of the Coordinator, International Statistics, Census Bureau, after a two-year assignment with the Foreign Operations Administration as statistical adviser to the Government of Paraguay.

George L. Brinkmann is now employed as Survey Statistician (Economics) in the Business Division of the Bureau of the Census at Suitland, working on special retail surveys.

David W. Calhoun is now a biometrician in the Biological Research Department at G. D. Searle and Company, Skokie, Illinois.

Herbert H. Coburn is currently employed as Counseling Psychologist at the Brockton Veterans Administration Hospital.

Besse B. Day, formerly with the Engineering Experiment Station, Bureau of Ships Laboratory at Annapolis, has transferred to the Research and Development Division of the Bureau of Ships, Department of the Navy, as a consulting statistician. She is responsible for developing and coordinating a program for the utilization of statistical techniques in the experimental work of the Bureau, including its laboratories and contracts.

David B. Duncan has recently resigned his position as Professor of Statistics at Virginia Polytechnic Institute, Blacksburg, Virginia. He has accepted an appointment as Statistical Consultant in the Statistical Laboratory and Professor of Agronomy (statistics) at the University of Florida, Gainesville, Florida.

William F. Elkin is now Biostatistician in the Fife-Hamill Memorial Health Center, Philadelphia, Pa. This newly created position has a two-fold purpose: to make analytical studies of the program of this demonstration health center, and to organize statistical procedures which will be a model for all district health centers in Philadelphia facilitating coordination of their activity with the central office of the Philadelphia Department of Public Health.

Roe Goodman has accepted an assignment in Chile under the auspices of the Food and Agriculture Organization, to which organization he has been transferred from the Technical Assistance Administration of the United Nations. He completed his assignment in Jamaica under the latter organization in August, 1954 and proceeded to Santiago, Chile, with his family in late September, where he is to remain for one year. In Chile he is working in connection with an agricultural census, the first in that country since 1936.

Kenneth Harwood, Chairman of the University of Southern California's Department of Telecommunications, has been elected First Vice President

of the National Society for the Study of Communication for 1955. He is to be President of NSSC in 1956. The Society is composed of some 500 educators, business executives, professional people, and representatives of government and military services from all parts of the United States and several foreign countries who share an interest in problems of human communication.

George Hermanson, formerly in the Division of Productivity and Technological Developments, Bureau of Labor Statistics, has accepted an assignment as a member of the BLS Productivity Team in Paris.

Earl E. Houseman, Office of the Administrator, Agricultural Marketing Service, is on leave to serve as Visiting Professor of Biological Statistics for the spring semester in the Department of Plant Breeding, Cornell University.

E. Gartly Jaco has joined the staff of the Department of Neuropsychiatry, University of Texas Medical Branch in Galveston as Sociologist. In addition to teaching, he will participate in research into the incidence, treatment and rehabilitation of mental patients. The project is supported by the Russell Sage Foundation.

Ralph Janoschka, formerly in the Office of the Assistant Chief, Business Division, Census Bureau, has been appointed Chief of the Priority Processing Section of the new Census Operations Division.

George H. Kennedy is now working as an analytical statistician in the biological sciences, Allied Sciences Division, Camp Detrick, Frederick, Maryland. He was formerly with E. I. Dupont de Nemours and Company, Inc., at Stine Laboratory, Newark, Delaware.

Wharton F. Keppler has recently transferred from his position as Statistician, U. S. Naval Ordnance Test Station, Inyokern, California, to Eglin Air Force Base, Florida, where he is an Operations Analyst, Office of Operations Analysis, Deputy Chief of Staff/Operations, Air Proving Ground Command.

Benjamin Lipstein, formerly with the Office of Statistical Standards, Bureau of Labor Statistics, has resigned to accept a position with Audits and Surveys Company, New York City.

B. F. Lynip, Jr., formerly Director of Planning and Statistics for the California and Hawaiian Sugar Refining Company at San Francisco, has been appointed Director of Marketing Research for the Merchandising Division of the Monsanto Chemical Company, St. Louis.

W. Parker Mauldin has been granted leave from the Bureau of the Census to accept a twelve-month assignment from the UN Technical Assistance Administration to go to Egypt to assist the Egyptian Population Commission in analyzing demographic trends in that country.

K. R. Nair was elected Chairman of a Sub-Committee on Methods of Research in Tropical Forestry at the Fourth World Forestry Congress held in Dehra Dun, India on December 11–22, 1954.

Rexford C. Parmelee, formerly Executive Secretary of the Intensive Review Committee, Office of the Secretary of Commerce, has been appointed to the newly created position of Chief Statistician of the Bureau of Mines.

Joseph S. Rhodes has resigned his position as Mathematical Statistician, Office of the Comptroller, Department of the Air Force, to accept a position as Methods and Operations Research Officer with the Chesapeake and Ohio Railway Company, Cleveland, Ohio.

J. R. Steen has been Manager of Quality Control for the Radio and Television Division of Sylvania Electric Products, Inc., with headquarters at Buffalo, New York, since January 1. For the present he is located at Batavia, New York.

Joseph V. Talacko, Assistant Professor of Mathematics, Marquette University, Milwaukee, Wisconsin, returned in February from California to Milwaukee. He plans to spend the rest of his 1954/55 Ford Foundation Fellowship at the Committee on Statistics, the University of Chicago.

Donald S. Thompson, First Vice President of the Federal Reserve Bank of Cleveland, has been elected President of the Real Property Inventory of Greater Cleveland. The RPI is a non-profit corporation which gathers and tabulates vital real estate and population statistics. It is supported by the city, county, Board of Education, banks, daily newspapers, public utilities, industries, realtors and others.

David A. Warriner, Jr. has been appointed to the position of Research Assistant in the Department of Research, Census and Planning, of the New Orleans Public School System.

William W. Wright has left *Architectural Forum* and *House and Home* and has taken a position in the market research department of the Corning Glass Works in Corning, New York.

THE FUTURE ANNUAL MEETINGS OF THE ASSOCIATION WILL BE HELD AS FOLLOWS:

	Headquarters	Dates
1955 New York City	**Hotel Biltmore**	**December 27–30, 1955**
1956—Detroit, Mich.	Hotel Sheraton-Cadillac	September 7–10, 1956

CHAPTER NOTES

AUSTIN

The Austin, Texas, Chapter had Dr. Viva Boothe as guest speaker at a luncheon meeting on January 10th. Dr. Boothe, who was an undergraduate student in the University of Texas, is now Director of the Bureau of Business Research of Ohio State University. She spoke on the statistical activities and problems of a Bureau of Business Research, with particular emphasis on the integration of research with teaching and with the publications program.

At the January 13th dinner meeting the Chapter had as speaker Dr. Frank G. Dickinson, Director of the Bureau of Medical Economic Research, American Medical Association, Chicago. The discussion by Dr. Dickinson of statistics in the realm of medical economics was unusually well attended.

CENTRAL NEW JERSEY

A meeting was held at Princeton on January 25th at which Dr. Frederic M. Lord, Research Associate at the Educational Testing Service, spoke on "Dealing with Errors of Measurement." At the February 14th meeting Ansley J. Coale, Research Associate in the Office of Population Research, discussed "Estimated Errors in the 1950 Census." The March 7th meeting, which was sponsored by the Committee on Social Statistics and which was held in Trenton, heard a talk by Wayne Vasey, Dean of the Graduate School of Social Work at Rutgers University.

The Committee on Social Statistics, under the leadership of Dr. Marguerite Hall and W. J. Netschert, is conducting a series of meetings during the remainder of the year. At the meeting on February 23rd various members of the Committee made brief presentations describing the statistical functions of their department or organization.

CHICAGO

At the dinner meeting held on January 27th the Chapter had as speaker Nat Weinberg, Director of the Research and Engineering Department of the United Automobile, Aircraft and Agricultural Implement Workers of America, C.I.O. Mr. Weinberg's topic was "The Thinking Behind the U.A.W.-C.I.O. Guaranteed Employment Plan." The speaker at the February 24th dinner meeting was Maurice Fulton, Partner, Fantus Factory Locating Service. The subject of Mr. Fulton's talk was "Statistical Analysis of the Economic Factors Involved in Plant Location."

Joint luncheon meetings were held with the Chicago Chapter of the American Marketing Association on February 3rd and March 3rd. The speaker at the first of these was William O'Dell, President of Market Facts, Inc., whose subject was "Critique of Consumer Motivation Studies." At the March luncheon Francis Pilgrim, Assistant Chief of the Acceptance Division of the Quartermaster Food and Container Institute, discussed "Techniques for Predicting Consumer Acceptance of Foods." Luncheon meetings were also held on January 20th, at which Frederick Mosteller, Professor of Statistics at Harvard University, spoke on "Statistical Analysis of the Learning Process;" and on February 17th, at which Richard Nelson, Vice-President of the Real Estate Research Corporation, had as his subject "Interpretation of Residential Building Trends in Chicago and Suburbs."

CLEVELAND

How Eastman Kodak uses statistics to maintain the quality of color photographs was explained by James E. Jackson at a meeting of the Cleveland Chapter on January 24th. Mr. Jackson is statistician in their Color Technology Division at Rochester, New York.

The method of paired comparisons has been used at Eastman Kodak to develop standards for both color prints and transparencies. In a typical designed experiment, a standard color scene was reproduced with 12 different filters. This made possible 78 paired comparisons which were given to 13 observers and their responses were registered. Statistical analyses suggested that observers preferred heavy-density prints of photographs with red colors and light-density prints of photographs with blue colors.

Dr. Carl A. Bennett, chief statistician at the Hanford Atomic Project, was the speaker at the February meeting of the Cleveland Chapter. He discussed the application of statistics to personnel problems at the West Coast plutonium plant operated by the General Electric Company.

Three general types of personnel problems have been handled with statistical techniques. First-aid visits, absenteeism and injury data have been summarized and described using frequency distribution analysis. This analysis has provided the basis for identifying and studying individual personnel cases. Further, control chart plots of incidence rates over time has directed attention to the development of significant fluctuations in these rates requiring remedial action.

DENVER

At the dinner meeting held on January 13th Dr. Alonzo B. May, Chairman of the Economics Department of Denver University, spoke on "The Next Twenty Years: An Economic Forecast." Dr. May predicted a prosperous year for 1955, particularly for the Rocky Mountain region. He foresees increases in the national income and total employment, accompanied by a moderate increase in unemployment due to the inability of the economy to take care of all of the increase in the labor force. Looking ahead to 1965 he predicted an average family income of $7,000 at the 1953 price level.

Miss Maxine Kurtz, a member of the Denver Planning Commission, as well as of the Denver ASA Chapter, was the speaker at the February 10th workshop meeting. She spoke on "Statistics as an Aid in Crystal Ball Gazing," discussing the use of statistics in the development of a comprehensive planning program for the Denver urban area. Her talk was illustrated with slide films.

LOS ANGELES

A dinner meeting was held on January 27th at which the subject was "Statistical Methods Employed in Present-Day Marketing Analysis and Research." Dorothy D. Corey, marketing and opinion research consultant and managing partner of "Facts, Consolidated," and Dr. Arthur Auble, Associate Professor of Business Statistics at Claremont Men's College, spoke to an unusually large meeting. A demonstration of the new Victor Multimatic Adding Machine followed the regular program.

The topic for the February 24th dinner meeting was "Automation in Perspective." The speaker was Dr. George W. Brown, Senior Staff Engineer of the International Telemeter Corporation. The new Monroe Three Bank Calculator was demonstrated following the meeting.

NEW YORK

The Statistical Techniques Division held a meeting on January 12th at which a method of time series analysis based on a Markov chain model was discussed. T. W. Anderson of Columbia University described its application to attitude changes in a political party preference study, while Isadore Blumen of Cornell University discussed an application to industrial mobility shown in a study of a sample of workers under Old Age and Survivors Insurance.

At the January 26th meeting of the Economics and Social Statistics Divisions Mortimer Spiegelman of the Metropolitan Life Insurance Company discussed national population trends and estimating techniques. He pointed out some trends in the labor force and the age distribution of the population, as well as the effects of increasing life expectancy. The Business and Economics Division also held a meeting on February 24th at which the topic was "Productivity Accounting in the Firm." The speakers at this meeting were Hiram S. Davis, author of a recently published book on this subject, and William Langenberg of the Cost Accounting Department, Johnson & Johnson.

The Biostatistics Division met on March 3rd to hear J. Stuart Hunter of the American Cyanamid Company speak on "Finding Operating Conditions Which Yield a Maximum Return," with particular application to chemical and biological production.

ST. LOUIS

The January 19th luncheon meeting heard Joseph J. McAndrew, Manager of the Tabulating Department, Federal Reserve Bank of St. Louis, speak on "Management and Economics of Tabulating Installations." The speaker at the luncheon meeting of February 23rd was Lawrence V. Conway, Assistant Professor of Economics, whose subject was "Demand for Housing—Boon or Bane to Economic Progress?" Dr. Conway discussed factors influencing the demand for housing which were analysed as a part of a survey of housing made at the University of Illinois.

WASHINGTON

The Washington Statistical Society held its annual dinner meeting on January 24th, honoring Stuart A. Rice, who retired last December as Assistant Director for Statistical Standards, U. S. Bureau of the Budget. Ralph J. Watkins, Director of Research of Dun and Bradstreet and President of the American Statistical Association, was chairman of the meeting. Dr. Rice described some of his experiences as a statistician in Washington, and discussed developments in the field of statistics.

The subject of the February 21st meeting, held jointly with the District of Columbia Sociological Society, was "Methodological Problems in Social Research: Reports on the Norristown Study." Papers were presented by Dorothy Swaine Thomas of the University of Pennsylvania on "An Experiment in Interdisciplinary Community Research" and Sidney Goldstein, also of the University of Pennsylvania, on "Methods for Demographic Research in the Community." Henry S. Shryock, Jr., Bureau of the Census, was chairman, and Conrad Taeuber, Bureau of the Census, was discussant.

CONTRIBUTED PAPERS SESSIONS FOR 1955 ANNUAL MEETING

Members of the American Statistical Association and their guests are invited to submit papers for the Contributed Papers Sessions to be held at the 1955 Annual Meetings in New York City, December 27–30.

One session will be devoted to papers of interest to the **Business and Economic and the Social Statistics Sections.** A second session will include papers of interest to the **Biometric and the Physical and Engineering Sciences Sections.** Papers on **Training** can be submitted to either session.

The papers may be concerned with pure statistical methodology or the findings of statistical studies or anything in between. They should be limited to ten minutes of speaking time, or about five double-spaced typed sheets. Each should be accompanied by an abstract of not less than 100 words. If it is desired that only the title be read, then the paper should be so designated and only the abstract need be submitted. Final deadline for submission of papers is September 15, 1955.

Papers on **Business, Economic or Social Statistics** should be sent to one of the following: *Dr. Clarence D. Long, Johns Hopkins University, Baltimore, Md.; Dr. A. J. Jaffe, Bureau of Applied Social Research, Columbia University, New York 27, N. Y.; Dr. S. L. Wolfbein, U. S. Bureau of Labor Statistics, U. S. Dept. of Labor, Washington 25, D. C.* Papers on **Biometrics and Physical and Engineering Sciences** should be sent to *Dr. Boyd Harshbarger, Head, Dept. of Statistics, Virginia Polytechnic Institute, Blacksburg, Va.*

We are especially interested in obtaining papers from statistical students and younger members of the Association. Members who are teachers or supervise junior personnel are urged to call this notice to the attention of their students or assistants. Copies of this notice for posting on bulletin boards can be obtained from the Secretary of the Association.